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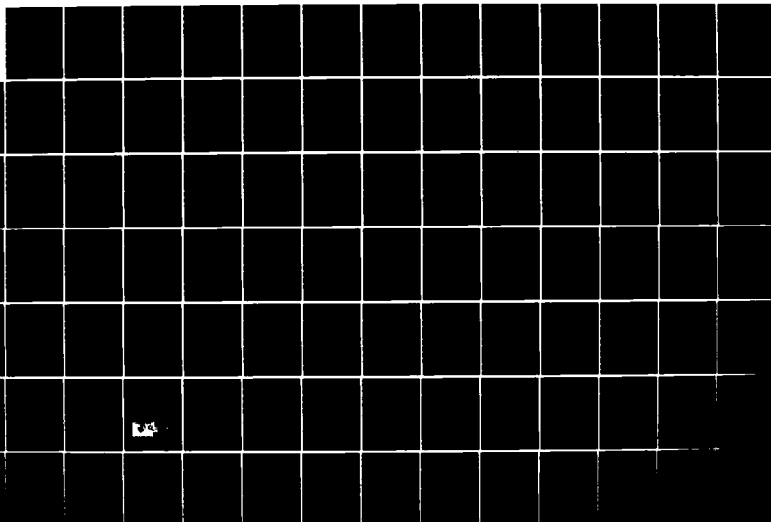
AN ARCHEOLOGICAL OVERVIEW AND MANAGEMENT PLAN FOR THE
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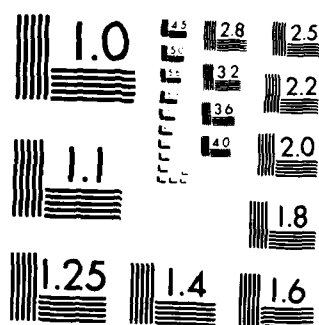
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**Final
Report No. 19**

October 1, 1984

**An Archeological Overview and
Management Plan for the
Pueblo Depot Activity,
Pueblo County, Colorado**

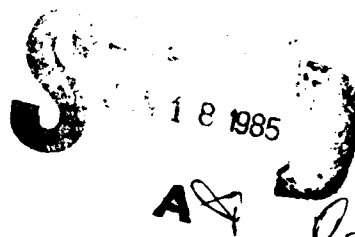
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**National Park Service
U.S. Department of the Interior**
Atlanta, Georgia 30303

for the
U.S. Army Materiel Development and
Readiness Command

by

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16. Abstract (Limit: 200 words) Pueblo Depot Activity near Pueblo, Colorado, is an installation of the Department of the Army's DARCOM command. As a steward of 22,654 acres of public land, the Pueblo Depot Activity is responsible for the appropriate management of any included prehistoric and historic archeological materials that remain within it. Until now, there has been no comprehensive review of any of the cultural resources of the facility. While there has been a variety of historic and modern disturbance of the facility lands, some 13,316 acres of land are undisturbed. A review of the regional prehistory and interviews with local collectors indicate that archeological sites may still exist within the Pueblo Depot Activity. Based on this and other information, a suggested scope of work and cost estimates have been developed to assist DARCOM in the evaluation of baseline archeological data and the development of an appropriate historic preservation plan and program.				
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The following document is an archeological overview and management plan for the Pueblo Depot Activity. Even though no archeological sites are presently recorded on the facility property, the cultural history of the surrounding area indicates that a diversity of archeological resources could occur in the undisturbed areas of the facility. The environmental history of the Pueblo Depot Activity area is used to predict the geomorphological deposits most likely to contain cultural resources.

Should archeological sites with physical integrity be found on the Pueblo Depot Activity, they will probably be of important scientific research value and sociocultural value. Archeological research in the area still has many gaps, and the archeological resources found on the depot activity property are expected to fill at least some of these. There are at least ten potential prehistoric archeological resource locations (and probably more) now known on the facility property. Adequate steps are needed to record and effectively manage these resources. Indiscriminant artifact collecting may have already depleted the archeological resource base to a large degree.

Given the placement of proposed future land-disturbing activities at the Pueblo Depot Activity, an intensive field survey of a stratified sample of the facility's undisturbed property is recommended as a first step in establishing an historic preservation plan. Archeological resources found during survey will be evaluated for their potential nomination to the National Register of Historic Places. Inventory survey activities will also place the recorded resources within a regional

framework, and a written report of the results will be an end product. Inventory and evaluation of the ten potential archeological resources is also a recommended management activity. The background documentary resources research and evaluation will bring together other necessary information about the nature of the archeological resources of the Pueblo Depot Activity.

Anticipated costs for accomplishing these management recommendations should range between \$21,840 and \$27,300 in FY84 dollars.

PREPARERS AND QUALIFICATIONS

John Montgomery of Nickens and Associates (Montrose, Colorado), prepared the following DARCOM overview and management plan for the Pueblo Depot Activity, Pueblo, Colorado. He has earned a BA (with honors), MA, and a PhD in Anthropology with emphasis in Southwestern archeology. During nine years of fieldwork, Dr. Montgomery has worked in the Southern Plains (Texas), south and west Texas, the northern Rio Grande Valley, southwestern Colorado, and the eastern Colorado plains. Dr. Montgomery has written or co-written five major cultural resource management reports and many smaller reports, as well as a monograph on his archeological research in south Texas.

ACKNOWLEDGEMENTS

At the Pueblo Depot Activity, Mr. Curtis Turner provided enthusiastic support for this work, and served as guide to the pertinent information located at the facility. Mr. Ed St. Clair and Mr. Mel Bird also provided engineering and construction information. Mr. Glen Scott and Dr. Ted Hurr, both of the U. S. Geological Survey, pointed out basic information sources concerning the geology and water resources in the facility area. Ms. Nancy Gauss of the Colorado Preservation Office made the review of the area's archeological resources more complete by allowing the examination of several hard-to-obtain references. Dr. Gordon C. Tucker, Jr., and Ms. Diana Christensen (staff archeologists at Nickens and Associates) helped put together the environmental and paleoenvironmental sections, respectively. Ms. Carol Rolens, also staff archeologist with Nickens and Associates, compiled and wrote the majority of the historic archeological background.

Additional thanks go to Dr. Mark R. Barnes, NPS, SERO; Mr. Jack Rudy, NPS, RMRO; and Ms. Mary Lee Jefferson, NPS, WASO, for reviewing the first draft; and Ms. Susan Cleveland, Contracting Officer, NPS, SERO.

Final report production, including graphics, has been completed by Woodward-Clyde Consultants, with editorial review (particularly of management recommendations) and text preparation completed by Dr. Ruthann Knudson and Ms. Betty Schmucker.

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FOREWORD

As a federal agency with large public land holdings, the U. S. Army is responsible for the stewardship of a variety of natural and cultural resources that are part of its installations' landscapes. The Army's Materiel Development and Readiness Command (DARCOM) presently manages a nationwide network of 65 installations and 101 subinstallations and separate units, which range in size from one acre to over one million acres. As part of its programs of environmental and property management, DARCOM has requested that the U. S. Department of the Interior's National Park Service (NPS) provide technical guidance to develop programs for managing installation cultural resources.

NPS is thus conducting the DARCOM Historical/Archeological Survey (DHAS), which has two major disciplinary elements. The architectural review and planning function is being directed by the Service's Historic American Buildings Survey (HABS), while the prehistoric and historic archeological resource assessment and planning function is the responsibility of the Service's Interagency Resource Division (IRD). IRD has contracted with Woodward Clyde Consultants (WCC) for the development of guidelines for the DARCOM archeological management planning effort, and for the completion of over 40 overviews and plans throughout the United States. WCC has in turn subcontracted the technical studies to several regional subcontractors, with final editorial review of reports and preparation of text and illustrations handled by WCC.

This overview and recommended management plan for the archeological resources of the Pueblo Depot Activity Area was prepared by Nickens and

Associates, under subcontract to WCC. It follows the guidance of "A Work Plan for the Development of Archeological Overviews and Management Plans for Selected U. S. Department of the Army DARCOM Facilities," prepared by Ruthann Knudson, David J. Fee, and Steven E. James as Report No. 1 under the WCC DARCOM contract. A complete list of DHAS project reports is available from the National Park Service, Washington, DC.

The DHAS program marks a significant threshold in American cultural resource management. It provides guidance that is nationally applicable, is appropriately directed to meeting DARCOM resource management needs within the context of the Army's military mission, and is developed in complement to the state Resource Protection Planning Process (the RP3 process, through State Historic Preservation Offices). All of us participating in this effort, particularly in the development of this report, are pleased to have had this opportunity. Woodward-Clyde Consultants appreciates the technical and contractual guidance provided by the National Park Service in this effort, from the Atlanta and Washington DC offices and also from other specialists in NPS regional offices in Philadelphia, Denver, and San Francisco.

Woodward-Clyde Consultants

Ruthann Knudson

INTRODUCTION

The following report is an overview of and recommended management plan for the prehistoric and historic archeological resources that are presently known or likely to occur on the Pueblo Depot Activity in Pueblo County, Colorado (Figure 1-1). This facility is an installation of the U. S. Department of the Army DARCOM (Materiel Development and Readiness) Command, which as a reservation of public land has responsibilities for the stewardship of the cultural resources that are located on it. The assessments and recommendations reported here are part of a larger command-wide cultural resource management program (the DARCOM Historical/Archeological Survey, or DHAS), which is being conducted for DARCOM by the U. S. Department of the Interior's National Park Service. The following is that portion of the facility-specific survey that is focused on the prehistoric and historic resource base of the Pueblo Depot Activity, and was developed in accordance with the Level B requirements as set forth in the archeological project Work Plan (Knudson, Fee, and James 1983). A companion architectural study is in preparation by NPS's Historic American Building Survey (HABS), but is not yet available (William Brenner, personal communication 1984).

1.1 PURPOSE AND NEED

All DARCOM facilities must manage the cultural resources found within their property. Several Federal laws and regulations set forth cultural resource management requirements. These include, but are not limited to, the following:

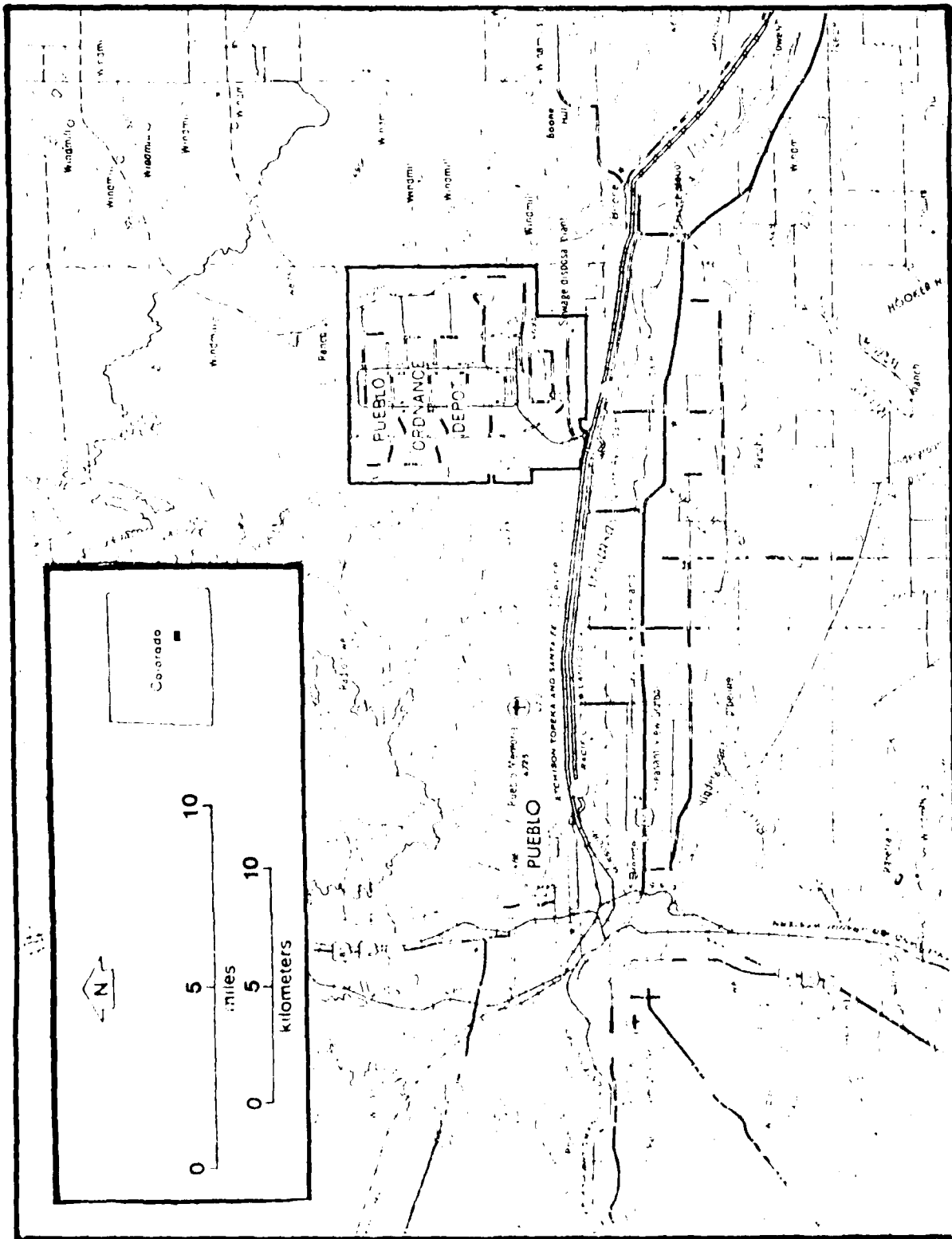


Figure 1-1. MAP OF THE GENERAL VICINITY OF
THE PUEBLO DEPOT ACTIVITY

- The National Historic Preservation Act of 1966 as amended (80 Stat. 915, 94 Stat. 2987; 16 USC 470) required an inventory, evaluation, and nomination (where appropriate) to the National Register of Historic Places archeological properties controlled or owned by a DARCOM agency. This act also requires a DARCOM agency to contact the Advisory Council on Historic Preservation before any ground-altering activity occurs on the agency's property. The agency must take into account the project's effect on any National Register-listed or eligible property and finish and appropriate data recovery program before such a site is damaged or destroyed.
- Executive Order 11593 (36 FR 3921) places leadership in the preservation of national cultural resources on the Federal agencies controlling those resources. This insures that all cultural resources on an agency's property are protected. The federal agencies are responsible for identifying, evaluating, and nominating (where appropriate) to the Federal Register of Historic Places all cultural resources found on their land.
- The Archeological and Historic Preservation Act of 1974 (88 Stat. 174, 16 USC 469) requires a Federal agency to notify the Secretary of Interior of any agency project which will destroy a significant archeological site. The Secretary or the notifying agency may support data recovery programs to preserve the resource's information.
- The Archeological Resources Protection Act of 1979 (93 Stat. 721, 16 USC 470aa) establishes criminal and civil penalties for anyone damaging archeological resources on DARCOM property. This act also allows the Secretary of the Army to issue excavation permits for archeological resources on DARCOM lands.

- 36 CFR 800 "Protection of Historic and Cultural Properties" (44 FR 6068; as amended May 1982) are the procedures for complying with Section 106 of the National Historic Preservation Act.
- Regulations from the Department of the Interior for determining site eligibility for the National Register of Historic Places (36 CFR 60, 36 CFR 63), and standards for data recovery (proposed 36 CFR 66).
- United States Department of the Army procedures and standards for preserving historic properties (32 CFR 650.181-650.193; Technical Manual 5-801-1; Technical Note 78-17; Army Regulation 420-40) and procedures implementing the Archeological Resources Protection Act (32 CFR 229).

These and other federal, state, and local regulations require management of cultural resources at the national level and at the level of the DARCOM facility. Effective compliance with these regulations and guidelines occurs by including cultural resource managers in the DARCOM facility planning process. Efficient management of DARCOM facility cultural resources occurs when the cultural resources are known and potential ground disturbing effects can be identified and evaluated during project planning.

1.2 THE PUEBLO DEPOT ACTIVITY

The Pueblo Depot Activity is located approximately 10 miles east of Pueblo, Colorado on U.S. Highway 50 (Figure 1 1). The smaller town of Avondale, Colorado is 2.5 miles south of the Pueblo Depot Activity. The depot's location is strategic in that it is close to a large urban transportation and distribution center (Pueblo), as well as Fort Carson, the U.S. Air Force Base, and the North American Air Defense Command (NORAD).

Commissioned on December 27, 1941 as a result of the First Powers Act of 1941, Executive Order 90001, the Pueblo Depot Activity now encompasses 22,654 acres. Construction on the depot began in 1942 after the lands were acquired through condemnation, purchase from private individuals, and exchange with the State of Colorado for other federal lands. Initially the Pueblo Depot was an ammunition storage and supply facility. Its mission has changed several times over 30 years (Inland Pacific Engineering Company 1982:4) to the current one which has seven objectives. Pueblo Depot Activity is presently a reserve storage/maintenance facility providing (1) limited receipt, storage, and issue of commodities, (2) maintenance of these commodities, (3) limited facility maintenance, (4) operation of a calibration laboratory and provision of calibration service for an assigned geographic area, (5) demilitarization, (6) ammunition surveillance, and (7) small arms clipping and linking (Inland Pacific Engineering Company 1982:1).

The current array of buildings and use areas at the Pueblo Depot Activity is complex (Figure 1-2). Buildings and use areas on the depot property have been grouped together according to their primary function. These groups are listed below with a brief description of their contents.

Group 1: a demolition area containing an ammunition demolition pit, two burning areas, a furnace, two burning cages, an air pollution monitor station, and a chemical disposal area

Group 2: a grazing area leased to private parties; an ammunition disassembly plant is located in the middle of this area

Group 3: a utility services area with a railroad track

Group 4: a high explosive ordinance storage area with nine "blocks" of igloos, interconnecting roadways, railroad tracks, and air monitoring stations

Group 5: an ammunition workshop area containing six general purpose warehouses, a heating plant, fuel storage types, seven ammunition renovation buildings, a flammable materials storage facility, industrial waste treatment plants, a decontamination building, several interconnecting roads, railroad tracks with two loading and unloading docks, and two landfill disposal sites

LEGEND

1. DEMOLITION AREA
2. GRAZING AREA
3. UTILITY SERVICES
4. HIGH EXPLOSIVE ORDNANCE STORAGE AREA
5. AMMUNITION WORKSHOP AREA
6. SAFETY AREA
7. SALVAGE AREA
8. OPEN STORAGE AREA
9. EQUIPMENT MAINTENANCE AREA
10. GRAZING AREA
11. FAMILY HOUSING AREA
12. RECREATION AREA
13. SHOP AREA
14. ADMINISTRATIVE AREA
15. GENERAL SERVICES ADMINISTRATION AREA
16. LAND FILL AND DISPOSAL AREA
17. STANDARD MAGAZINE AREA
18. WAREHOUSE AREA
19. SERVICE AREA
20. SHOP AREA
21. COMBAT VEHICLE TEST AREA
22. SEWAGE TREATMENT AREA
23. GRAZING AREA
24. FIRING RANGE
25. LIQUID PROPELLANT STORAGE AREA
26. RECREATION AREA
27. GUIDED MISSILE WORKSHOP AREA
28. RECREATION AREA
29. ADMINISTRATIVE AREA
30. COMMUNITY AREA

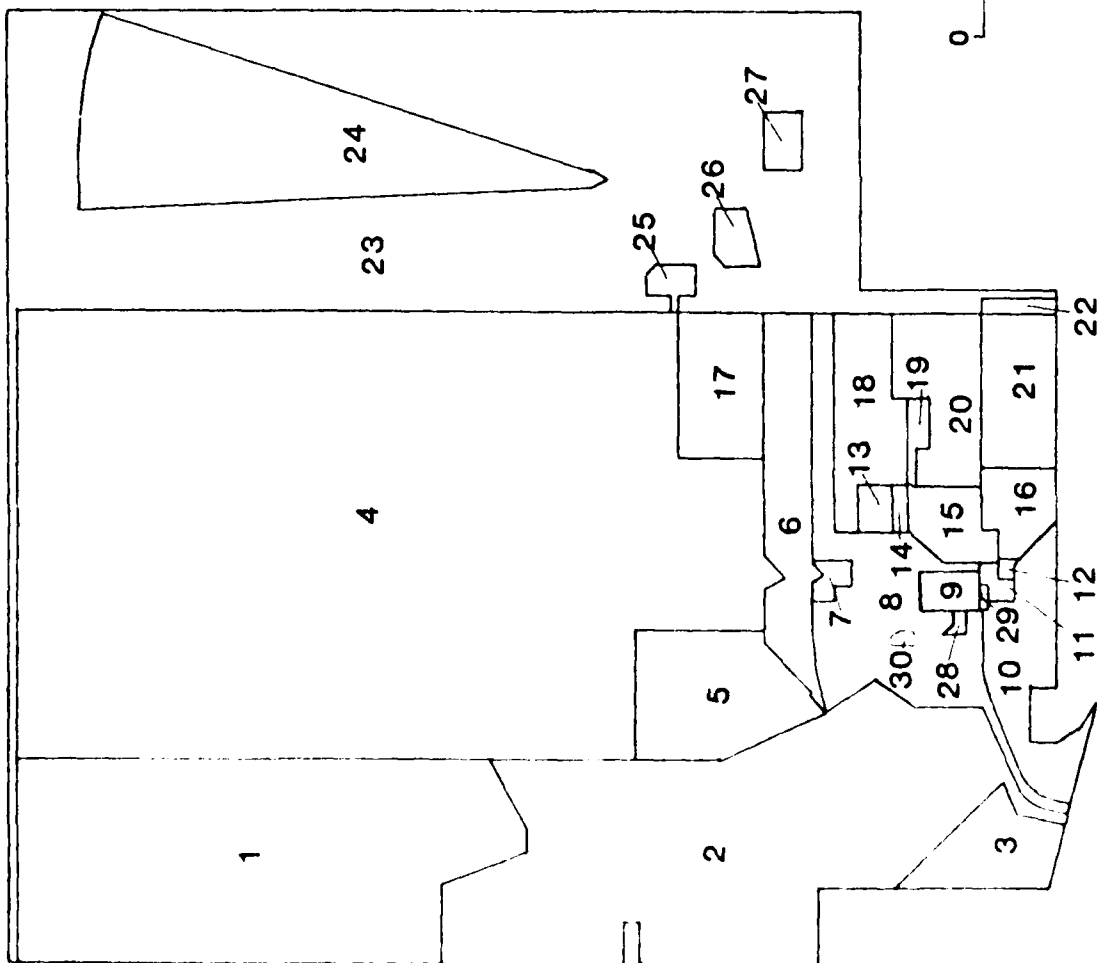


Figure 1-2. MASTER BASE MAP OF THE PUEBLO DEPOT ACTIVITY

Group 6: a safety area containing roadways, railroad tracks, a water well, a pesticide mixture facility, and an engineering facility

Group 7: a salvage area with a flammable materials storehouse, a change house, a general purpose warehouse, a septic tank drainage field, and railroad tracks

Group 8: an open storage area where petroleum products are stored. Scattered between the fenced open storage yards are six water wells, an underground reservoir system composed of a water pump building, reservoir, a helipad, an engineering building, an administration building, a general purpose warehouse, a transit shed, and a fenced substation

Group 9: an equipment maintenance area containing eight equipment maintenance shops, three equipment storehouses, nine fuel storage/distribution buildings, a heating plant, four specialized equipment shops, two engineering facilities, a dispatch building, truck loading facilities, a septic tank drain field, an incinerator, and a series of water treatment buildings; railroad tracks and roadways crisscross the area

Group 10: a grazing area leased to private parties

Group 11: the family housing area composed of seventeen military and civilian housing units, sixteen detached storage units, a waiting shelter, and roadways

Group 12: a recreation area with tennis courts

Group 13: a shop area comprised of five vehicle maintenance shops, a guided missile maintenance facility, an inoperative restaurant, a vehicle repair depot, a general purpose maintenance shop, an engineering facility, a 60 ton hoist, a loading/unloading dock, railroad tracks, a general purpose warehouse, a fuel storage area (gasoline and diesel, oil storage/distribution and two strainer pits), and interconnecting roadways

Group 14: an administrative area with three general purpose administration buildings, a financial administration building, a general purpose machine shop, an automatic data processing building, and roads

Group 15: the General Services Administration area made up of three large general purpose warehouses, a water pump and water reservoir buildings, nine flammable materials storage buildings, railroad tracks, and roads

Group 16: a land fill and disposal area with one road to the land fill

Group 17: the standard magazine area containing three railroad tracks, twenty-one ammunition renovation shops, one general purpose magazine, three storehouses, two large parking lots, a water well, and a heating plant with a general purpose administration building

Group 18: a warehouse area composed of nineteen general purpose warehouses, six controlled humidity warehouses, two open warehouse facilities, three loading/unloading docks, two public toilets, two administration buildings, a general purpose machine shop, a box and crate shed, a vehicle repair station, a gasoline station, a lunch room, railroad tracks, and roads

Group 19: a service area with a large heating plant, a sewage pump house, a set of railroad tracks, and three parking lots

Group 20: a shop area containing a large guided missile antenna test site and building, two compressed air plant buildings, five guided missile maintenance facilities, a general purpose maintenance shed, and roads

Group 21: the combat vehicle test area with a vehicle maintenance shed, a septic tank drainage field, and an oval shaped roadway

Group 22: the sewage treatment area comprised of five buildings

Group 23: a grazing area leased to private parties, containing a water storage tank, an air pollution monitor station, and unimproved roads

Group 24: the firing range with three ammunition demilitarization facilities and roadways

Group 25: the liquid propellant storage area composed of five liquid propellant storage facilities, an ammunition renovation shop, a septic tank drainage field, and a railroad track

Group 26: the Linda-Ann Reservoir recreation area

Group 27: the guided missile workshop area composed of two ammunition renovation shops, a flammable materials storage facility, a guided missile maintenance facility, three septic tank drainage fields, an air pollution monitoring station, and roads

Group 28: a recreation area with a park, flag pole, and parking lot

Group 29: an administrative area made up of the post headquarters, a fire station/engineering administration building, a dispensary, a general purpose administration building, a civilian personnel building, a waiting shelter, the sentry main gate house, roads, and parking lots

Group 30: the community area with two workshops, two general warehouses, a general instruction building, a photography laboratory, the Officers Open Mess, a swimming pool facility (with a bath house, a chlorinator building, and wading pool), and roads.

1.3 SUMMARY OF PREVIOUS ARCHEOLOGICAL WORK CONDUCTED ON THE PUEBLO DEPOT ACTIVITY

No professional archeological survey work or excavations have been conducted on the Pueblo Depot Activity property. Activity employees, however, have unsystematically collected paleontological fossils and Indian artifacts from the facility property for many years. A small cultural resource survey was conducted near the town of Boone, about three miles southwest of the Pueblo Depot Activity (Buckles 1980a).

1.4 THE SOCIOCULTURAL CONTEXT OF THE ARCHEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

Archeological resources on the Pueblo Depot Activity property are important for research and humanistic reasons. Archeology, as a science, uses such resources primarily for scientific research. Persons interested in prehistory address archeological topics including the development and changes of human societies, when important technical developments occurred, how people adapted to their environment, and how stone tools and other implements were made. Prehistoric archeological resources are the record of human society before written documents existed.

Historic archeological resources are also important research data. The scientific study of these materials can confirm and even expand the written record of a region. Historical research can be important for other, more humanistic reasons. The descendants of early Euroamerican inhabitants will find their sense of cultural heritage enriched through the documentation and study of historic archeological resources. Historic properties (structures, bridges, farmsteads, etc.) may have architectural details or history which could be important to historic preservationists. The rich history of Pueblo and the fact that many Hispanic Americans currently live in the Pueblo area combine to make much of the historic archeological sites in the area important resources of Hispanic cultural heritage.

The prehistoric and historic archeological remains of the area are potentially significant to Native American tribes. While they may no longer live near the facility, Native Americans consider archeological remains to be a significant part of their cultural heritage. Religious and cultural significance is an especially sensitive issue when dealing with Native American burials.

AN OVERVIEW OF THE CULTURAL AND RELEVANT NATURAL HISTORY
OF THE PUEBLO DEPOT ACTIVITY

2.1 THE PHYSICAL ENVIRONMENT

This section describes the earth, water, climatic, plant, and animal resources of the modern environment that were likely available for human use during the historic period. The following description is intended as a baseline for comparison with interpretations of paleoenvironmental conditions.

2.1.1 Earth Resources

The Pueblo Depot Activity is located in the southern portion of the Colorado Piedmont section of the Great Plains physiographic province (Fenneman 1931). The Colorado Piedmont is a broad, shallow basin formed about 28 million years ago when erosion stripped off Pre-Tertiary sediments from an area near the mountains. Most of these sediments were stripped away by the Arkansas River and its tributaries.

As a unit, the Colorado Piedmont is a broadly rolling but locally scarped old erosion surface. The Colorado Piedmont slopes east from an average altitude of 5000 feet near the Arkansas River to an elevation of about 4000 feet at the Colorado-Kansas border. At the foot of the Rocky Mountains, all strata dip steeply eastward and form the "hogback" of Dakota sandstone. East of the mountains, river valleys are generally wide with flat channels. These valleys are bordered by terraces and contain braided streams. Present valley size is proportional to the size of the stream that cut the valley.

The Pueblo Depot Activity is situated close to the Arkansas River Basin. This local basin is underlain by two major geologic units: bedrock and Quaternary surficial deposits. Surface deposits lie on thick deposits of Pierre Shale. The Pierre Shale bedrock is Upper Cretaceous in age and composed primarily of siltstone and claystone. Sandstone and sandy shale occur near the top and bottom of the unit. Fossiliferous concretions occur throughout the unit and limestone masses (forming conical buttes) also occur in the unit. The Niobrara Formation limestone exists below the Pierre Shale. Outcrops of the Pierre Shale occur along Haynes Creek in the northeast corner of the Pueblo Depot Activity as well as along minor tributaries of the Arkansas River in the western and southern portions of the depot.

Quaternary deposits of the Arkansas River Basin can be divided stratigraphically into three major groups of deposits: Pre-Wisconsin, Wisconsin, and Recent (Hunt 1954; Scott 1963, 1969). Pre-Wisconsin deposits found on the Pueblo Depot Activity are the Verdos Alluvium and Slocum Alluvium (Scott et al. 1978). Verdos Alluvium has been correlated (in age) to the Yarmouth Interglaciation or the Kansan Glaciation of the Pleistocene. This alluvium consists of weathered gravels lying on a cut surface approximately 240 feet above the Arkansas River. In other areas of the Colorado Front Range these deposits contain the remains of fossil horse, rodents, and reptiles (Hunt 1954; Scott 1963). The Slocum Alluvium is more recent in time than the Verdos. It has been dated to the Sangamon Interglaciation or the Illinoian Glaciation of the Pleistocene. Slocum Alluvium is a deposit of weathered gravel resting on a cut surface about 100 feet above the Arkansas River (Scott et al. 1978). A major portion of the Pueblo Depot Activity is now covered by Verdos Alluvium deposits (Scott et al. 1978), and small pockets of Slocum Alluvium are found on the east side of Chico Creek and along the northern edge of the Arkansas River.

Wisconsin deposits on the Pueblo Depot Activity are the Broadway alluvium and eolian sands. The Broadway Alluvium consists of thin

gravelly deposits on terraces 40 feet above the Arkansas River. This alluvium is dated to the Pinedale Glaciation of the Pleistocene. A small pocket of Broadway Alluvium exists in the southwestern corner of the facility property. The Broadway Alluvium is derived from the erosion of deep clayey pre-Wisconsin soils that mantled the upland areas. Vertebrate fossils found in this deposit include camel, bison, and antelope. In the northeastern portion of the Pueblo Depot Activity there is a unit of eolian-derived sand dated to the Pinedale Glaciation of the Late Pleistocene; these sands may also be Holocene in age, however. These deposits are fine to coarse windblown sand.

Recent-aged geological deposits include the eolian sand mentioned above, Piney Creek Alluvium and Post Piney Creek Alluvium. The eolian sand unit (above) could be Holocene in age and represent the reworking of Wisconsin eolian deposits. Recent eolian sand is difficult to distinguish from the Pleistocene sand. Piney Creek Alluvium is a silty to gravelly humus-rich alluvium found along the Arkansas River and its tributaries. Osteological remains taken from Piney Creek alluvium include bison, antelope, deer, lagomorph, and rodent. Along the Front Range, abundant archeological materials have been found in these deposits. Charcoal from a hearth in this alluvium has been dated to 1150 \pm 150 radiocarbon years (Scott 1963).

Post-Piney Creek and younger alluvial deposits are found along the floodplains of the Arkansas River and its major tributaries. These geologic units consist of sandy to gravelly alluvium, and they are sometimes difficult to distinguish from Piney Creek Alluvium.

The modern landscape surrounding and including the Pueblo Depot Activity is a result of a combination of geological events which laid down many deposits of different thickness and composition. Quaternary and earlier deposits contain fossils that provide clues about local paleoenvironmental conditions. Many of these fossil bones are culturally modified, and, when coupled with other evidence such as chipped stone

artifacts, indicate that human populations have inhabited the area for ten to twelve millenia. Distinctive artifactual assemblages are associated with particular geological strata, a relationship that has assisted geologists in dating some of these strata. An understanding of the local depositional sequence provides information about the variety and density of cultural remains one expects to find in a particular geological deposit. As an example, the eolian sand deposits could contain Paleo-Indian artifacts of more recent age. However, the Piney Creek alluvium will not contain Paleo-Indian artifacts (unless the artifacts have eroded from another location and redeposited in the Piney Creek alluvium) because the geological deposit postdates the age of the artifacts.

These geological deposits, along with climate, have played a major role in developing local soils. Six major soil associations occur on the Pueblo Depot Activity: the Limon-Razor-Midway Association, the Valent Association, the Olney-Vona Association, the Stoneham-Adena-Manzanola Association, the Cascajo-Schamber Association, and the Las Animas-Glenberg-Apishapa Association (Soil Conservation Service 1979). The first four of these soil associations are soils on the plains while the latter two are soils on terraces and floodplains. Each of these is described briefly below, following Soil Conservation Service (1979).

The Limon-Razor-Midway Association is found in the northeastern corner, the southeastern corner, the western edge, and as a central strip on the Pueblo Depot Activity. Soils in this association are deep to shallow, well drained silty clay, silty clay loams, clay loams, and clays that have formed in materials weathered from shale. They are easily eroded.

Soils of the Valent Association form a strip east of and parallel to Chico Creek. They are deep, excessively drained loamy sands and sands that have formed in eolian sand deposits. These soils are subject to wind erosion.

The Olney-Vona soils association occurs as a pocket located in the northern portion of the depot area. These soils are deep, well-drained sandy loams and loamy sands that have formed in eolian parent materials. Blowing soil is a problem with this association.

The soils of the Stoneham-Adena-Manzanola association are deep, well-drained loams, clay loams, sandy loams, and silty clay loams that have formed in loess and in loamy and clayey alluvium. This soil association occurs widely over the Pueblo Depot Activity, especially in the central and eastern portions of the Depot area.

Soils of the Cascajo-Schamber association are found as a small pocket in the extreme eastern edge of the Pueblo Depot Activity. They parallel a portion of Haynes Creek. These soils are deep, well-drained to excessively drained gravelly sandy loams that have formed in coarse textured alluvium on high terraces and terrace edges.

Finally, the Las Animas-Glenberg-Apishapa association are soils found along Chico Creek in the western portion of the depot property. These soils are deep, somewhat poorly drained to well-drained fine sandy loams and silty clays that have formed in alluvium.

2.1.2 Water Resources

The Arkansas River and its tributaries were the major source of water for aboriginal groups in the study area. Three small drainages flow through the Pueblo Depot Activity. Haynes Creek flows from north to south through the northeastern portion of the Depot area. Several unnamed tributaries of Haynes Creek drain higher portions of the Depot. The unnamed tributaries hold water seasonally, while Haynes Creek contains water year round. Haynes Creek ultimately flows into the Arkansas River several miles south and east of the depot boundaries.

Boone Creek drains the central part of the Pueblo Depot Activity. Several unnamed tributaries carry water into Boone Creek, and an

artificial dike in Section 23 has created a small reservoir. Boone Creek is identified as an intermittent stream. A spring exists in the upper reach of this drainage.

The western portion of the Pueblo Depot Activity is drained by Chico Creek. Numerous unnamed tributaries intermittently flow westward from the Depot into Chico Creek as it travels southward to the Arkansas River. Areas west of the Depot are drained by intermittent tributaries and Andy Creek, which flow south and east into Chico Creek. Chico Creek carries water intermittently. In Section 20, an eastward-flowing intermittent tributary of Chico Creek has been diked to form a very small reservoir of permanent water.

Discounting the artificial drainages created by the Pueblo Depot Activity, the interior of the Depot is drained by numerous intermittent streams flowing westward and southward, as well as a few flowing eastward. Water was available year-round in Haynes Creek while the remaining stream held water seasonally. The spring in Boone Creek may have provided water year-round as well.

While all of these drainages may have failed during severe droughts, the Arkansas River undoubtedly was always a permanent source of water. The Arkansas River is located as close as two miles south of the Pueblo Depot Activity. Prehistoric inhabitants of the depot activity and surrounding area had several choices for sources of water. Most of these water sources could be used during times of normal precipitation and one source could be used during times of drought.

2.1.3 Modern Climate

The Pueblo Depot Activity area has a semi-arid, Mediterranean type of climate. Average annual precipitation is 11.9 inches and at least 75 percent of the possible sunshine is received every month. Information from the Pueblo City Airport (five miles west) provides the following climatic overview.

Springtime precipitation results from warm, moist air flowing from the south over Pueblo. The frequent showers and thunderstorms last into the summer months. Warmer temperatures also melt the snowpack in the mountains to the west, and late spring flooding can occur. The summer months bring the highest average daytime temperatures (low 90°F) but the heat is alleviated somewhat by low relative humidity and cool nights. Thunderstorms occur frequently (1 out of 3 days) and provide the largest monthly precipitation averages of the year. During the fall months, cooler air from the north moves into the Pueblo area causing sudden drops in temperatures. This cooler northern air generally lacks moisture so fall precipitation is lower than the spring and summer months. The winter months are mild due to abundant sunshine and the protection of the nearby mountains. Cold air masses occasionally move through the area, causing very cold temperatures and blizzard conditions. Precipitation in the winter months is usually less than at other times of the year.

The average growing season for Pueblo County is 167 days. The last freeze in the spring usually occurs on or near April 29 and the first freeze in the fall usually occurs on or near October 13 (Soil Conservation Service 1979:87).

2.1.4 Plant Resources

The Pueblo Depot Activity is located in the Northern Temperate Grassland, as defined by Shelford (1974). Plants in the area have adapted to high rates of evapotranspiration, which exceed precipitation. Local soil characteristics and erosion have influenced the types and density of plants in the area. Plants in and near the Pueblo Depot Activity are associated with the short-grass biome of the Northern Temperate Grassland.

The short grass grassland was originally covered by blue grama (Boutela gracillis) and buffalo grass (Buchloe dactyloides). Shelford (1974) includes Galleta grass (Hilaria jamesii) in this original grassland community. While Weber (1972:374) notes that this grass is

rare along the Front Range, this grass is listed as probably present at the Pueblo Depot Activity (Inland Pacific Engineering Company 1982:131). Pasture sagebrush (Artemesia frigida) was very common and widespread on gravelly hillsides. Forbs included pasque flower (Pulsetilla patens), butterweed (Senecio anreus), copper mallow (Sphaeralcea coccinea), aster (Aster ericoides), blazing star (Hiatris punctata), and smooth goldenrod (Solidago missouriensis). The Depot area supports a diversity of plant species. Today at least 51 introduced and 131 native plants have been recorded in the area (Inland Pacific Engineering Company 1928:129-132).

These plants provided forage for the resident herbivorous animals hunted by prehistoric groups. Many of the plants were probably important to prehistoric groups for ethnobotanical reasons and as food sources. Information is absent on the ethnobotany of the Indian groups that occupied the region in historic times. Gilmore (1977) writes of the use by other aboriginal groups of the same plant species found in the project area.

2.1.5 Animal Resources

Under native conditions the short-grass grassland biotic region of the Northern Temperate Grassland was populated by herbivores, lagomorphs, rodents, carnivores, and birds (Shelford 1974). Bison and pronghorn are the major herbivores. Early Euroamerican explorers found herds of a million or more bison in the region during the nineteenth century. These herds preferred the open grasslands, moving north in summer and south in early winter. Pronghorn (American antelope) also occurred in great numbers. These ungulates lived in rolling topography and sought shelter in ravines and cottonwood covered valleys during storms. More restricted in their migratory habits than bison, pronghorn would move during winter to areas where the snow was thin.

The lagomorphs included the white-tailed jack rabbit and the desert cottontail; both were numerous throughout the area. Various species of burrowing rodents, including ground squirrels, pocket gophers, and mice,

lived in the area. The rabbits and rodents were eaten by carnivores, including coyotes, wolves, foxes, badgers, and skunks. Avian species included various perching birds, the lesser prairie chicken, and owls. Reptiles consisted almost entirely of snakes, including the plains garter snake, western rattlesnake, and the bull snake.

2.1.6 Paleoenvironment

Paleoenvironmental reconstruction uses a diversity of proxy data. These proxy data range from biological evidence such as pollen and plant macrofossils, the inferred migration of plant species, faunal analysis of fossil vertebrates and invertebrates, archeological data and radiocarbon dates of flora and fauna to geological evidence largely based upon glaciation, alluvial sedimentation, stream erosion and eolian and lacustrine deposition. Reconstructions are complicated by the nature and intensity of climatic change on a worldwide, regional and local level. As Bryson, Baerreis, and Wendlund (1970:55) state, "the atmosphere and climate of the world does not uniformly get warmer or drier or wetter or colder even though the world mean may change that way." Our attempt to understand past climate, especially as it becomes radically contracted in scope the further back in time one goes, results in generalizations over broad areas and across long time spans that cannot adequately reflect the given climate in a particular area at a specific time.

The reconstruction of the paleoenvironment of Southeastern Colorado is difficult because the proxy evidence has not been collected in the area. Data from adjacent areas such as the Laramie Basin in southeastern Wyoming, the Llano Estacado of the Texas Panhandle and the pollen and alluvial sequences of Kansas and Nebraska are used to reconstruct the paleoenvironment of southeastern Colorado. The time frame for this paleoenvironment reconstruction is from approximately 15,000 BP (before present) to the present. It encompasses the last portion of the final glacial advance, known as the Wisconsin, which dates from approximately 23,000 BP to 12,500 BP in the south and 9500 BP in the north (Wright 1970:157), and the entire Holocene (Recent) Epoch which follows the

Pleistocene. The specific region for which this paleoenvironmental reconstruction is postulated is the Denver Basin of east central Colorado, which is a small portion of the larger Central Plains Region (see Wedel 1978:184).

From the final period of glaciation in the area (15,000 BP) to the present day, there were dramatically differing environments on the Central Plains of east central Colorado (Table 2-1). During the final widespread glacial advance, large areas of the Rocky Mountains were covered with glaciers. The outlying areas of the Plains and High Plains were comparatively arid, at least more arid than the subsequent Altithermal period (Wells 1970b:1579). Glacial evidence from the Colorado Front Range (Benedict 1973) indicates that the glaciers had begun to retreat from the Colorado Mountains by about 10,000 BP. The foothills below the mountains were moderately cool and moist during the final period of glaciation (Benedict 1975, 1979; Benedict and Olsen 1978).

Late Pleistocene pollen records indicate that a boreal spruce forest was present on the Northern Plains as far south as northeast Kansas (Wells 1970b:1574) and that a pine-spruce forest existed on the Llano Estacado of Texas (Wells 1970b:1575). Some scholars feel that the continental ice sheets extended out onto the Central Plains (Dreeszen 1970:9). Concurrent with the continental glaciation, stream erosion was extremely active, even at considerable distances beyond the continental ice sheets. The thick alluvial deposits with eolian loess and dune deposits constitute an important part of Pleistocene deposition on the Plains (Dreeszen 1970:10). It was also during the late Pleistocene that thousands of playa lakes were filled in the Llano Estacado and the vegetation was the dominant pine spruce forest (Wendorf 1970:23 24). This period (the Tahoka Pluvial on the Llano Estacado) ended slightly after 14,000 BP. By 11,000 BP there were still some wooded areas, and summer temperatures were cooler and winter temperatures warmer than present. Shortly after the appearance of humans there was a continued decline in available moisture leading into the arid period known as the

Table 2-1. A SUMMARY OF THE ENVIRONMENTAL HISTORY OF THE AREA OF THE PUEBLO DEPTO ACTIVITY

Benedict 1975 (Indian Peaks) Geomorphology, Pollen		Wendland 1978 (Eastern North America) Pollen, Archeology, Vegetation	
Date ^a	Inferred Climate	Date ^a	Inferred Climate
300 BP to 100 BP	Reduced summer temperatures and decreased summer precipitation	100 BP to Present	Dry or very dry
950 BP to 300 BP	Warm and relatively moist	400 BP to 100 BP	Generally cooler
1,850 BP to 950 BP	Heavy and persistent winter snowfall; vegetation zones slightly higher than present	1,260 BP to 850 BP	Somewhat moister
		1,680 BP to 1,260 BP	Generally warmer
3,000 BP to 1,850 BP	Somewhat warmer and wetter than present	2,760 BP to 1,680 BP	Cooler
5,000 BP to 3,000 BP	Cool, moist conditions; vegetation zones depressed	5,060 BP to 2,760 BP	Initially moister condition followed by increased desiccation

Table 2-1. A SUMMARY OF THE ENVIRONMENTAL HISTORY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Benedict 1975 (Indian Peaks) Geomorphology, Pollen		Wendland 1978 (Eastern North America) Pollen, Archeology, Vegetation	
Date ^a	Inferred Climate	Date ^a	Inferred Climate
6,500 BP to 5,000 BP	Pollen evidence indicates cooler and/or wetter conditions; however, geomorphic evidence suggests warm and moist conditions	8,490 BP to 5,060 BP	Drier and/or warmer; northward expansion of grasslands and northern limit of forests
7,500 BP to 6,500 BP	Arid climate; vegetation zones stood slightly higher than present; warmer summer temperatures, and reduced winter precipitation	9,300 BP to 8,490 BP	Gradual warming period; vegetation border moving northward and grasslands expanding eastward
10,000 BP to 7,500 BP	Progressively warmer and drier	10,030 BP to 9,300 BP	Gradual warming period
12,000 BP to 10,000 BP	Moderately cool and moist	Before 10,030 BP	Temperatures a few degrees cooler; gradual shift from boreal forests to grasslands indicating a drying and/or warming trend

^a BP = years before present, with a present baseline of AD 1950.

Scharbauer Interval, when mammoths disappeared from the Llano Estacado. The Lubbock Pluvial of approximately 10,000 to 10,200 BP marked the onset of pluvial conditions again (Wendorf 1970:25). The Llano Estacado varied from open grasslands (lusher than today in the area) with forests along riverine stretches, to patchy pine spruce forests alternating with grassy parks due to more effective moisture than is available today (Harris 1977:1). Proxy evidence based on vertebrates indicates warmer winters than today, and increased winter precipitation, based on high sagebrush values (Harris 1977:4).

From approximately 10,000 to 7500 BP the Colorado Rocky Mountains became progressively warmer and drier. Cirque glaciers may have readvanced about 8000 BP (Benedict and Olson 1978:71). During the Altithermal (7500 to 6500 BP) the area became arid and vegetation zones were slightly higher than their present level. Between 6500 and 5000 BP there was a moderate increase in precipitation. By about 5000 BP cooler and moister conditions caused the Front Range glaciers to advance (Benedict and Olson 1978:71-72).

There exists strong evidence from the Laramie Basin of southeastern Wyoming that at approximately the same time period (5000 BP), a forest of western red cedar (Juniperus scopulorum) and western yellow pine (Pinus ponderosa) existed where today the basin is more arid than most surrounding areas. Macrofossils and woodrat middens indicate that the area contained a forest, whose remnants remained until approximately 200 BP. Wells (1970a:1579; 1970b:196) also points out that upland forests or woodland areas currently exist on the Great Plains. This occurs primarily near escarpments or major topographic breaks where there are differences in elevation and precipitation, or protection from prairie fires. These isolated woodland patches appear to be remnants of a much more widespread phenomenon across the Great Plains.

An interstadial interval beginning about 3000 BP caused the glaciers in the Front Range to withdraw or disappear. Conditions were warmer and

moister than the present day (Benedict and Olson 1978:72). Heavy snowfall caused a minor glacial advance in the Front Range from 1850 to 950 BP but from 950 to 300 BP the glaciers began a slow retreat only to have a short interval of renewed glacial activity from 300 to 100 years ago (Benedict and Olson 1978:73).

2.2 THE CULTURAL ENVIRONMENT

Archeologists working in the Great Plains recognize four major prehistoric traditions: Paleo-Indian, Plains Archaic, Plains Woodland, and Plains Village (Willey 1966). Local manifestations of the traditions are named phases, foci, or complexes. In this discussion, each tradition is broken into segments of time, called periods. These cultural-historical units and their associated temporal spans are listed in Table 2-2. The area covered by this discussion is the foothills and plains of Southeastern Colorado (Colorado Preservation Office 1983). The Frontier and Historic traditions follow the prehistoric traditions. These two traditions are associated with historically documented Indian tribes and the Euroamericans who lived in the study area.

A draft of the eastern Colorado Plains archeological research design (Colorado Preservation Office 1983) was followed in this overview.

2.2.1 Prehistory

The cultural chronology of the foothills and plains of Southeastern Colorado begins with the Paleo Indian tradition. This tradition is characterized by the association of man-made tools with the bones of now extinct animals such as mammoth, large forms of bison, horse, and camel. While Paleo Indian cultural materials are most often associated with Pleistocene megafauna, it is probable that seasonal (or opportunistic) exploitation of smaller animals and vegetal products also characterized their adaptation.

TABLE 2-2. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Cultural Unit					
Tradition	Period or Phase	Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
Historic	Recent	Post AD 1930	Urbanization, isolated concentrated farms, ranches; establishment of military base	City and small towns support service and industries. Varied crop production and livestock raising; tourism	Metropolitan center; modern housing; farmsteads and isolated ranch; urban and rural highways; internal combustion engine
Historic	Early Farms	AD 1900 to 1930	Larger farms and ranches; towns	Varied crop production and livestock production	Farms and ranches (some abandoned due to drought and Great Depression); major irrigation ditches and flood control devices; towns
		AD 1850 to 1900	Isolated homestead	Dryland and irrigation farming, livestock raising; town support services and industries	Homestead - farms, ranches, towns, irrigation canals
Historic	Pre-Farm	AD 1700 to 1850	Ranches; agricultural villages; development of towns along river route	Ranching; farming; development of regional transportation	Ranch sites; agricultural sites; railroads; towns

TABLE 2 (Continued). A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Cultural Site	Period of Occupation	Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
Fair Trade	AD 1600 to 1860		Individuals and small groups of trappers along river and major drainages of the Arkansas River; temporary agricultural communities	Hunting; trapping; trading	Native American and European artifacts; base camps; temporary trading posts, military forts; trading outposts; temporary agricultural communities; trails; roads and stagelines
Explorations	AD 1640 to 1820		Exploratory expeditions of Spanish, French, and American individuals and groups along the Arkansas River and its major drainages. Native American camps and short-term village. Sites are often campsites near sources of water and a variety of environmental habitats; small ridge and hills with views were preferred	Hunting; gathering; trading; attempt at agriculture. Nomadic hunter/gatherers moved seasonally, following bison herds; these bands had changed from pedestrian hunter/gatherers to primarily horse nomad groups	Short-term campsites and villages; trails; Dismal River pottery and campsites with a variety of lithic and bone tools associated with Plains Apache, Utes, and Comanche. Cheyenne and Arapahoe entered the area after the Comanche

TABLE 2-2 (Continued). A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Cultural Unit					
Tradition	Period or Phase	Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
Plains Village	Middle Ceramic	AD 1000 to 1550	Open sites and rockshelters in deeper canyon indicate a seasonally nomadic hunting/gathering lifestyle with some focus on part-time horticulture	Hunting of both large and small animals combined with the gathering of wild plant food resources; sites may be seasonally occupied camps for groups living permanently east of the area. Cultigens found at many sites.	Small triangular arrow points, chipped stone tools, ground stone tools, bone tools and shell ornaments and tools with distinctive varieties of cord-marked pottery. Stone and slab foundation habitations
Plains Woodland	Early Ceramic	AD 1 to 1000	Open campsites and rockshelters are located along major drainages of the Arkansas River. Most sites near springs or other permanent water	Bands of generalized hunters and gatherers moved occasionally to exploit a variety of plants and animal resources	Borger cord-marked pottery with triangular and side notched projectile points, a variety of chipped stone tools, ground stone, and bone tools. Stone foundation enclosures
Plains Archaic	Late Archaic	1000 BC to AD 1	Rockshelters in the canyon of major drainages of the Arkansas River and open campsites along the terraces and floodplains of drainages were occupied on a seasonal basis	Generalized hunting and gathering subsistence focused on a variety of plant and animals, including aquatic species	Corner notched projectile points with bifaces, unifaces, bone tools, ground stone, and snell ornaments. Semi-subterranean structure

TABLE 1. A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Period	Approximate Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
Paleo-Indian	8000 to 5000 B.C.	Open campsites and rockshelters were located to take advantage of water sources and a variety of environmental zones	Focus on the killing and processing of large and small animals and a variety of wild plants were gathered; seasonal movement of the hunting/gathering bands	Corner notched dart point, some of the McKean-Duncan-nanna series, a variety of chipped stone and ground stone artifacts
Early Archaic	5000 to 3000 B.C.	Open sites are located near permanent water sources and several environmental zones. Base camps and limited activity loci have been recognized	Seasonally mobile hunting and gathering bands obtained a variety of animals and plants for food	Corner notched points, chipped stone bifaces, unifaces, drills, utilized flake, and chopper. Ground stone artifacts
Paleo-Indian	5000 to 4500 B.C.	Kill sites, butchering station, long- and short-term campsites	Mass killing by stampeding bison into natural traps is the major theme; seasonal hunting and gathering of other food items is inferred	Concentrations of articulated and disarticulated bison bone; parallel-flaked projectile points are associated with lithic cutting and scraping tools and bone tools

TABLE 2-2 (Continued). A SUMMARY OF THE CULTURAL CHRONOLOGY OF THE AREA OF THE PUEBLO DEPOT ACTIVITY

Cultural Unit					
Tradition	Period or Phase	Date	General Settlement Patterns	General Subsistence Patterns	Kinds of Archeological Remains Representative of Period
	Folsom	9000 to 8000 BC	Sites near permanent water sources, at sandy blow-outs, and on hill-tops with strategic view	Primary activity is the hunting of extinct bison, supplemented by seasonal exploitation of available plants and smaller animals	Folsom points with lithic flakes, blades, drills, burins, bifaces, unifaces, choppers, ground stone tools, and bone tools
	Clovis	10,000 to 9000 BC	Sites near permanent water sources (stream-side, springs, lakes)	Major activity is the hunting of Pleistocene megafauna, such as mammoth, horse, and camel, as well as the seasonal exploitation of vegetal products and small animals	Clovis points with scrapers, core choppers, retouched flakes, and bone expediency tools
	Selby-Dutton	13,000 to 9500 BC	Kill sites, near permanent water sources such as springs, streams or lakes	Primary activity is the hunting of mammoth, as well as the seasonal exploitation of vegetal products and small animals	Spiral-fractured mammoth bone expediency tools, bone flakes, and bone cores with very few lithic flakes

In the Selby-Dutton Period (ca. 13,000 BC to 9500 BC), the majority of tools were made out of bone and were associated with mammoth kills. Informal bone tools and flakes have been found at the Selby-Dutton site and have been dated to 15,000 years ago (Stanford 1979), and a similar component may exist at the Lambs Spring site near Littleton, Colorado.

The Clovis period (10,000 to 9000 BC) is characterized by Clovis projectile points that often occur with stone scrapers, modified flakes, and core choppers. Components are associated with extinct mammoth, camel, and horse. A variety of informal bone tools and flakes have also been reported from Clovis sites (cf. Hester 1972). Clovis sites are generally located near stream-side situations, springs, or waterholes, and occur in several localities in eastern Colorado.

Folsom period (9000 to 8000 BC) materials are identified by Folsom projectile points, and are associated with both campsites and kill sites. The Folsom tool assemblage includes a variety of lithic flakes and tools, and bone tools. Folsom sites are associated with the remains of extinct bison (Bison antiquus) (Wilmsen and Roberts 1978). Surface finds of Folsom points are reported from the eastern Colorado Plains (Haug 1968:6). Archeological research in nearby regions provides an inferred picture of Folsom subsistence economy (Frison 1978:115-148).

Several new projectile points characterize the appearance of Plano period (ca. 8000 to 5500 BC) in the Great Plains. These parallel-flaked projectile points, and the other tools found associated with them, are referred to as complexes that appear at different times within the Plano period: The Agate Basin complex (from about 8400 to 7300 BC), Plainview (8200 to 7500 BC), Firstview (8000 to 7400 BC), the Hell Gap (8000 to 7600 BC), and the Cody complex (ca. 7000 to 5800 BC). Each of these is represented by sites in eastern Colorado, and they are associated with bison kills, long and short term campsites, and a highly developed stone tool technology.

The end of the Paleo-Indian tradition is marked by the dramatic loss of many large and small animal species and climate change. During the succeeding Plains Archaic tradition, inhabitants of the eastern Colorado Plains were no longer large-game hunters and gatherers. With the advent of the Altithermal climatic episode (5000 BC), hotter and drier conditions prevailed over the Plains. The inhabitants of the Great Plains lived on a variety of small animals and plants. This shift in subsistence adaptation is mirrored by a technological shift. Different types of projectile points were used on darts for hurling at animals, and ground stone tools for grinding plant materials became an important part of the Archaic tool kit. Rock art sites (petroglyphs) also appeared during the Archaic period (Buckles 1968; Schaafsma 1972).

The Plains Archaic Tradition is divided into three chronological periods: Early, Middle, and Late. Early Archaic is dated from 5500 to 3000 BC, concurrent with the onset of the Altithermal (Antevs 1955). Archeological evidence from the Early Archaic Period is not well documented on the Plains, due either to gaps in archeological research or to an abandonment of the area due to climate change. None of the Early Archaic sites in the Southeast Colorado Plains have been chronometrically dated. Typological cross-dating of projectile points allowed Science Applications, Inc. (1982) to identify three Early Archaic sites found in the John Martin Reservoir inventory. Campbell (1976) used this technique to classify sites on the Chaquagua Plateau as Early/Middle Archaic. Survey near the southern Rocky Mountain foothills and Park Plateau found five Early Archaic sites (Alexander, Hartley, and Babcock 1982; Lutz and Hunt 1979). These sites had projectile points similar to Early Archaic projectile points excavated at Magic Mountain (Irwin-Williams and Irwin 1966). The artifacts found at all of these Early Archaic sites are the remains of generalized hunting and gathering bands. These artifacts include chipped stone bifaces, unifaces, drills, utilized flakes, and choppers. Ground stone artifacts (manos and metates) are also common. Early Archaic settlement and subsistence patterns have become apparent as more archeological research is conducted in the area. Subsistence

activities included both the hunting of small animals and gathering of wild plants when these materials were available. Science Applications, Inc. (1982) found that base camps (where many activities occurred) were located on the south side of permanent water locations at lower elevations while limited activity camps are situated on the north side of permanent drainages.

During the Middle Archaic period (from 3000 to 1000 BC), southeastern Colorado was occupied by gathering and hunting bands equipped with a variety of dart points, other lithic tools, and ground stone artifacts. Most of the diagnostic artifacts can be compared with tools found along the Front Range and dated from 3000 to 1000 BC (Gunnerson 1981; Colorado Preservation Office 1983). McKean Complex tools (McKean, Duncan, and Hanna projectile points) are rare in southeastern Colorado, but these projectile points were found at Draper Cave (Hagar 1976) and during a survey of the Fort Carson Military Reservation (Alexander, Hartley, and Babcock 1982:180).

Middle Archaic sites include open campsites and rockshelters. Hearths and human burials are features found in rockshelter deposits. Subsistence items have not been reported from Middle Archaic sites, but the presence of ground stone artifacts in Middle Archaic tool assemblages suggests an increase in the exploitation of wild plant resources.

The Late Archaic period in southeastern Colorado lasts from 1000 BC until about AD 1. Archeological evidence indicates that the Late Archaic inhabitants of southeastern Colorado maintained a gathering and hunting lifestyle. Late Archaic sites include both rockshelters and open encampments located near canyons and drainages. These sites usually contain distinctive medium sized corner-notched projectile points along with a variety of bifaces, unifaces, and stone debris. Bone tools (including beads), shell ornaments, and ground stone (manos and metates) are also part of the Late Archaic tool assemblage.

Subsistence activities of Late Archaic migratory gathering and hunting bands focused on a variety of plants and animals. Seeds of snow-on-the-mountain, wild plum, gourd, yellow foxtail, and prickly pear were found at Trinchera Cave (Wood-Simpson 1976). At Carrizo Rock Shelter, pinon seeds and acorns were found (Kingsbury and Nowak 1980), and microscopic fibers of pinon, juniper, yucca, and flax were identified at the McEndree Ranch site (Shields 1980). Most of the animal remains excavated at Late Archaic sites are cottontail rabbits, but other animals include pronghorn, deer, bison, coyote, bobcat, prairie dogs, mink, fox, duck, quail, lizards, and rodents. Mollusk remains were found at the Carrizo Rock Shelter (Kingsbury and Nowak 1980).

Important other artifacts from Late Archaic contexts include split rod basketry and yucca fiber, cordage, and knots (Wood-Simpson 1976). Late Archaic features are usually hearths, but the McEndree Ranch site had a semi-subterranean structure with a floor basin and ramp entrance (Shields 1980). Artifacts made from Alibates dolomite and ocean shell (Olivella) are found in Late Archaic sites; these artifacts indicate that the local groups were probably involved in long-distance exchange networks.

The Plains Woodland tradition dates between AD 1 and 1000. In the southeast Colorado Plains, prehistoric groups continued to live as gathering and hunting bands during the early portions of the Plains Woodland tradition, but horticulture became more important over time. The time period of the Plains Woodland tradition is termed the Early Ceramic period. During the Early Ceramic period in the Southeastern Colorado Plains, ceramics, arrow points, and structures were technical innovations.

Many "Woodland" components and sites have been identified in southeastern Colorado. These sites usually contain side-notched dart points, along with small unnotched triangular arrowpoints and small stemmed/corner notched arrowpoints (such as Scallorn, Reed, Harrel, and

Young). Cordmarked ceramics often are part of the Early Ceramic Tool assemblage, as well as ground stone (mano and metate). Initially, Early Ceramic subsistence activities concentrated on the gathering and hunting of animals and plants. Intensive plant processing was noted at several sites (Colorado Preservation Office 1983), and animals of all sizes were taken for food. Whether small or large mammals were prepared as food depended on the environmental situation of Early Ceramic period sites. On the Chaquaqua Plateau, Early Ceramic period groups took a variety of animals (bison, deer, smaller mammal) and plants (gourds, plums, pinon) for food. Evidence of cultigens (two varieties of corn) has also been found in this area (Campbell 1976), suggesting that horticulture became an important economic activity by the end of the Early Ceramic period.

The pottery from Early Ceramic contexts is a cordmarked variety. A distinctive cordmarked pottery type, termed Borger Cordmarked (Suhm and Jelks 1962) occurs in sites dated to the latter portion of the Early Ceramic period. Structures appeared in southeastern Colorado during the Early Ceramic period. These structures occur primarily in the Chaquaqua Plateau and points south. Stone foundation enclosures have been dated to AD 450-750 (Campbell 1976). They are circular (3-5 m in diameter), with low horizontally placed, dry-laid slab foundations with basin shaped floors. After AD 750 the stone enclosures exhibit semi-subterranean floors and the sites are protected by barrier walls. Sites commonly occur in upper canyons, wide canyons, and floodplains, presumably to take advantage of prime agricultural lands (Colorado Preservation Office 1983). Contiguous enclosures were constructed in the area after AD 900. These enclosures are oval or oblong in outline with vertically placed sandstone slab foundations. Early Ceramic period structures have been recorded at the Red Top Ranch (Anderson 1976), the Belwood Site, on the Chaquaqua Plateau (Campbell 1976), and along Turkey Creek in northwestern Pueblo County (Withers 1964).

The Middle Ceramic period in the southeastern Colorado Plains lasted from AD 1000 to 1550. Archeological materials from this period occur with great frequency, and the variety of artifacts permit comparatively great interpretative detail into cultural adaptations. Populations in the Middle Ceramic period continued and refined the horticulture/hunting/gathering activities begun earlier. Three basic cultural items characterize Middle Ceramic sites. First, distinctive small unnotched triangular arrowpoints (Washita, Reed, and Fresno types) occur along with small corner notched arrowpoints (Scallorn and Ellis) types. Shallow-narrow cordmarked pottery (Borger Cordmarked) is a consistent part of the Middle Ceramic tool assemblage. Finally, Middle Ceramic period sites almost always contain stone and slab foundation habitation units (Campbell 1976; Kingsbury and Nowak 1980; Science Applications 1982). Other cultural features occur at sites dated to the latter part of the Middle Ceramic period. These include burned rock middens and stone rings (Greer 1965, 1966; Kingsbury and Nowak 1980).

Middle Ceramic period rockshelters (Medina Rockshelter, Carrizo Rockshelter, 5BA24, Trinchera Cave) illustrate the diversity of cultural features and subsistence items. Chipped stone artifacts include knives, bifaces, flake tools, unifaces, and projectile points. Manos and metates were used to process food items. Entrances to shelters and caves were often barricaded and features such as slab enclosures, jacal structures, hearthes, and storage pits (Wood-Simpson 1976) often occur in the site. Plant remains indicate that a diversity of cultigens and wild plants were used as food. These include several varieties of corn, beans, wild plums, prickly pear, cholla, juniper, gourds, and chokecherry. Refuse bones suggest the diversity of animals taken for food: small and large mammals, including cottontail rabbit, prairie dog, deer, pronghorn, bison, elk, coyote, duck, squirrel, gopher, turkey, and woodrat. Other animals, such as lizards, crayfish, and mollusks round out the diversity of animals eaten by Middle Ceramic groups. Rockshelters offer splendid preservation elements. Perishable cultural items from Middle Ceramic contexts are numerous and include: firedrills, cordage and knots

(Campbell 1976), snares, arrowshafts, yucca sandals, and basketry (Wood-Simpson 1976). The inventory of cultural artifacts from Middle Ceramic sites also include many bone tools and ornaments (beads), shell tools and ornaments, and red ocher.

Most of the Middle Ceramic period sites are rockshelters or caves, but surface structures in non-rockshelter locations have also been dated to the Middle Archaic. Most of these sites are slab enclosures of a circular, oval, or D-shape outline. They are often single habitation units located in inaccessible places. After AD 1300 stone rings and burned rock middens become more numerous (Campbell 1976). The burned rock middens were probably used to process mescal (Greer 1966).

Small villages of stone-enclosed habitation units have been recorded west and northwest of Pueblo, and east of Walsenburg (Ireland 1968). These sites contained a variety of architectural styles, and the associated artifacts and ecofacts indicate a strong reliance upon horticulture. The Snake Lakelee site does differ significantly from the others in the numerous butchered bison bone found there.

Middle Ceramic rock art is abundant in the southeastern Colorado Plains (Campbell 1969). Pictographs and petroglyphs have been recorded in many counties of southeast Colorado (Colorado Preservation Office 1983).

2.2.2 Ethnohistory

During the Ethnohistoric period (AD 1550 to 1800) the Southeast Colorado Plains was inhabited by part-time horticulturalists and bison-hunting Plains Indian groups (Buckles 1968; Hobert 1970). These groups generally moved southward due to conflict and population pressure from the north and east. When Coronado met the inhabitants of southeastern Colorado, they were identified as Plains Apache who lived in small horticultural hamlets. Historical references place the Plains Apache in eastern Colorado in either the early 1640s (Forbes 1960) or the

late 1600s (Thomas 1935), but the entry of the Plains Apache into the Plains is disputed (Husted and Mallory 1967; Wilcox 1981). These Athabascan-speakers were actually many groups, most of which have been termed the Lipan and Jicarilla Apache (Buckles 1968). Intrusions by the Utes and Comanches pushed the Plains Apache south during the early 1700s.

The Ute and Comanche (both Shoshonean speakers) quickly spread onto the Colorado Plains in place of the departing Plains Apache. By 1750 the Ute and Comanche split, with the Comanche occupying most of the eastern Colorado Plains. In 50 years the Comanche moved southward until they occupied the plains south of the Arkansas River. The Cheyenne and Arapahoe inhabited the plains north of the Arkansas River by the early 1800s. Both the Cheyenne and Arapahoe are Algonkian speakers who originally came from woodland regions north and east of eastern Colorado. The Cheyenne left their permanent villages and horticultural subsistence base to become famous Plains horse nomads (Strong 1940).

The Dismal River Aspect, dated approximately AD 1675-1725, is a Central Plains archeological complex that represents the Plains Apache groups (Gunnerson 1968). Gunnerson (1960) identified eight Dismal River sites in southeastern Colorado on the basis of distinctive micaceous tempered pottery and sand/grit tempered plain surfaced pottery. Similar sites were found by Campbell (1976); these sites also contained elongated, unnotched triangular points (Fresno) and side notched points, and small animal bone refuse.

Other types of sites in southeast Colorado have been dated to the Ethnohistoric period but have not been affiliated with the Dismal River Aspect. These include a burial with Olivella shell beads and a Unio shell pendant, stone rings (Kingsbury and Nowak 1980), and roasting pits (Colorado Preservation Office 1983).

2.2.3 History

The area near the Pueblo Depot Activity can be divided into three broad historical themes: 1) initial discovery and exploration, 2) early

colonization and exploitation, and 3) settlement expansion and economic diversification. This area contributed significantly to regional and state development. It has been occupied longer and more extensively than any other area in Colorado, and was a major crossroads for several early trails and roads, railroads, and more recent roads.

The historic tradition begins with Spanish explorations, includes the fur trade and gold discovery eras, continues through the development of agriculture (farming and ranching- which promoted town building), to the present when a variety of economic endeavors are pursued. A dominant developmental factor was the Arkansas River and its tributaries; these offered not only alternate transportation routes but also provided water, a resource basic to any permanent settlement.

Within the broader framework, six periods stand out in the Arkansas River Valley's history: 1) exploration, 2) fur trade, 3) open range cattle, 4) farming and livestock, 5) sugar beet/alfalfa farming, and 6) recent economic pursuits (Table 2-2). While these periods are as specific to the Pueblo Depot Activity as current literature permits, they also reflect the areas's development in a broader sense. Other than documenting the depot activity's establishment in 1942, because of its inland location and ideal climate (Taylor n.d.:226), available literature does not document historical events within its boundaries. Its proximity to locales where significant historical events have been documented suggests that related activities may have occurred on military reservation property. Such information may now exist only in archival records or in archeological remains. Results of the literature search are presented here.

Early exploration trips, originating in the Santa Fe area, were prompted by Spanish rescue or military missions; Archuleta made the first in 1664. He was followed by Ulibarri in 1706 who traveled up Fountain Creek approximately 10 miles west of the Depot, then headed east at a point about 10 miles north. Both of these rescues were to recover Pueblo

Indians who had become Apache slaves. In 1720, Villalpando led an expedition along the Arkansas River to investigate French claims on Mexico's northeastern border. Although not the first to enter the area, an explorer in Colorado, Long in 1820 was the first to return. Long returned along the Arkansas River after exploring the southwestern boundary of the Louisiana Purchase (Scott 1975:1).

Between 1815-1860, several cross country trails and roads were established (along with the Arkansas River and its tributaries) by fur trappers and traders. In 1821 Fowler led a party up the Arkansas to assess the fur trade, subsequently building cabins near Pueblo (Hafen and Hafen 1953:117; Scott 1975:2). Fort Cass, the first trading post established to conduct business with various Native American tribes, was erected on the Arkansas River's north bank six miles east of Fountain Creek in 1834 by Gantt and Backwell. That same year a major trading post, Bent's Old Fort, was located further east. Its establishment led to permanent European settlement in Colorado. With the collapse of the fur trade in the late 1830s, traders and trappers established agricultural communities.

Subsequently, the valley was traversed by explorers, military groups, and gold seekers. Both Dodge (in 1835) and Kearney (in 1845) followed the river to Bent's Fort after encouraging peace with the Indians (Scott 1975:3,4). In 1839 the Farnham party of emigrants headed for Oregon, and Wislizenus, on a curiosity trip, chose the river valley route (Hafen and Hafen 1953:106, 107; Scott 1975:3). Fremont's third and fourth western exploration expeditions also used it in 1845 and in 1848 (Hafen and Hafen 1953:103; Scott 1975:4). In 1846 Parkman selected the route on his return home after gathering data on French history in America (Hafen and Hafen 1953:108). Among the early gold seekers were Evans and one hundred and twenty-four men, including fourteen Cherokees. In 1849, this group paralleled the Arkansas River on what was henceforth called the Cherokee Trail. Two other parties seeking gold, Beck Ralston (1850) and Kellogg (1858) also followed this trail (Scott 1975:5).

It was during the late 1850s that a trail closest to the Depot's boundaries was used. Known as the Chico Creek cutoff, the trail begins at the Arkansas River and continues north along the activity's western border. In 1857, Sumner was sent to survey the southern boundary of the Kansas Territory and to chastise the Cheyennes. One company, led by Sedwick, took a different route, travelling up the Arkansas River, heading north at the cutoff, and proceeding cross country to Fountain Creek from which he continued on to rejoin Sumner on the South Platte River. In 1858 two gold seeking parties took the cutoff. One party consisted of the Russell brothers, John Beck, and some Cherokee Indians on their way to Denver. The other group of 434 people, known as the John Easter party or the Lawrence party, went first to Pike's Peak and later to Denver (Scott 1975:5).

With the Gold Rush of 1859 and the Colorado territory established in 1861, the area's population increased, leading to escalating conflicts with Indian tribes. Although most tribes were removed to Oklahoma by 1869, Fort Reynolds (approximately four miles south of the activity) was established (1867-1872) to suppress uprisings and to protect the settlers. Nearby, a ferry was built across the Arkansas River (Scott 1975:6, Taylor n.d.:225). Another military installation, Camp Fillmore, (1861?-1865), supposedly was built on the Arkansas's north bank approximately 2 miles from the Pueblo facility. It was a Civil War cavalry garrison and stage station (Scott 1975:6). The number of small towns in the region increased at this time. One of these, Booneville, grew out of a ranch site described as a stage station for passenger travel to the Pike's Peak Region's gold frontier and for supplying hay to the Arkansas River Valley military bases. By 1861 it was sold to Albert G. Boone who continued the stage company and served as postmaster (Buckles 1980a:6,7). Beginning at Booneville and continuing north along the activity's eastern periphery and Haynes Creek is what may be a continuation of this stageline. Available literature documents a trail or road, as described above, but does not define its purpose.

After the Civil War Euroamericans moved into the area, and the open range cattle industry flourished. It continued to thrive until hard winters of the late 1880s. Other significant factors leading to its decline included increasing pressure from homesteading, irrigation ditch construction, the government's prosecution policy for "illegal fencing", and overstocking the range. People taking advantage of the Homestead Act engaged in both dry and irrigated farming (Science Applications, Inc. 1982:235, 256). Near the Pueblo facility, the Haynes Creek Valley is known to be well-watered, presently supporting cottonwoods, willows, cattails, and heavy grasses (Buckles 1980a:4). Another impetus for the valley's development was the arrival of railroads. The Denver and Rio Grande from Colorado Springs to Pueblo was completed in 1872 and the Santa Fe stretched westward to Pueblo in 1876 (Abbott, Leonard, and McComb 1982:87; Taylor n.d.:225).

By 1900 the area had become a rich agricultural region. The expansion of large-scale irrigation projects and the rise of the dry farming movement (along with favorable climatic conditions) allowed farming to become as important as ranching. Sugar beets, and later alfalfa, were the most important crops. In 1921 a disastrous flood occurred and dams were built to control water as well as to provide more water for irrigation (Science Applications, Inc. 1982:235). The area suffered from the Drought and the Great Depression during the 1930s, and population declined. Largely because of World War II, the defense industry build up encouraged a resurgence in the area. Today agriculture thrives with livestock raising dominant, along with varied crop production and dairying. Tourism has grown as recreation areas have been more heavily used (Taylor n.d.:227). The area continues to be a multi-purpose crossroads.

2.3 ARCHEOLOGICAL RESEARCH DIRECTIONS

The comprehensive state preservation plan for the Eastern Colorado Plains has not been completed in final form (Butler 1982; Colorado

Preservation Office 1983). Significant prehistoric and historic archeological research problems identified in this draft document are followed, but since that document is not finished, all of the potential problems cannot be covered here. In the following discussion, the significant archeological research directions are identified in each cultural/temporal period. All of these topics and questions may be applicable to archeological resources on the Pueblo facility, but development of specific research directions must await further data on the resource base.

The age and stratigraphic relationships of the Selby-Dutton period Paleo-Indian sites must be determined. This period represents the initial human occupation of the Great Plains, and as such is an important and controversial research topic. Bone tool technology and use-wear studies will expand our knowledge of the Selby-Dutton tool assemblage. Archeologists continue to study the subsistence adaptations focusing on Pleistocene megafauna during the Paleo Indian Tradition. Archeological research in paleoclimate is concerned with human (and animal) adaptations to climatic change. Paleo-Indian mobility, and special site types and locations, are settlement pattern topics frequently studied by archeologists. During the Plano period, a large variety of projectile points were made, and the stylistic and technological attributes of these artifacts is a continuing research problem.

In the Early Archaic period, important questions revolve around impact of the postulated Altithermal (Antevs 1955) climatic period on the prehistoric groups on the Plains. Sediments from Early Archaic period sites should be studied to correlate the depositional histories and relative dates of different sites, and to obtain paleoenvironmental information. The distinct Early Archaic period corner/side notched projectile point style is similar to other regions; this similarity could imply extreme cultural mobility. Early Archaic period archeological resources also exhibit seasonality and different functions depending on the type of site being studied (Science Applications, Inc. 1982).

Archeological research dealing with Middle and Late Archaic Period sites should concentrate on several topics. Diagnostic tool types, especially projectile points, should be carefully studied for their technological, functional, and stylistic attributes. Technical and stylistic attribute analysis of Middle and Late Archaic period projectile point will evaluate the relationship between these points and the McKean complex points found north of the Colorado Plains. The analyses of subsistence items found in site deposits and tool functional analyses, coupled with chronological determinations, can trace temporal shifts in subsistence adaptations. The hypothesis that Middle and Late Archaic bands relied more heavily on wild plant resources, when compared to Early Archaic bands, requires testing with archeological field data. Site settlement analysis can help test the above hypothesis by examining the relationship of Archaic site locations with landforms and locally available environmental resources. The potential reasons why areal population density remained low until the Late Archaic, when it then increased dramatically, need to be explored (Science Applications, Inc. 1982).

Archeological research concerning Early Ceramic Period materials should follow three major topics: climatic reconstruction, introduction of pottery, and subsistence activities. The Early Ceramic Period has been generally correlated with slight shifts in climate, but on the whole the period is marked by moderate temperatures and increasing effective moisture. The period from AD 650-1050 is also called the Neo Atlantic (Wendlund 1978), and alluviation occurred in most Plains drainages. Excavators of Early Ceramic sites should be aware of this alluvial sequence, called the Post Piney Creek, and make efforts to date and stratigraphically record the site's depositional record. Another characteristic of the Early Ceramic Period is the introduction of a new technology, pottery manufacture and use, to the tool assemblage. The archeological question of the geographical origins of this pottery needs attention. Associated with this is the possibility that several different types of pottery may occur in the Colorado Plains and Foothills at this time. What are the possible cultural relationships between these

pottery types? The introduction of corn to the subsistence base profoundly affected the cultural adaptation of the inhabitants. Analyses of changing settlement mobility, the development of habitation structures, and the changing technological and functional aspects of tools (ceramic, lithic and bone) are fundamental archeological research topics applicable to the Early Ceramic period. In addition, there is evidence for the development of long distance exchange networks which provided the materials for the unique artifacts often buried with individuals. Detailed analysis of Early Ceramic period site data (artifacts, ecofacts, location) can further define the postulated Parker Focus/Phase cultural unit during the initial 450 years of the period as well as the later Graneros Focus and Apishapa Focus. Their relationship to the other Panhandle Aspect foci further east can be studied by regional comparison.

Many archeological research questions can be applied to Middle Ceramic period sites and artifacts. The apparent uniformity in material culture (except habitation structures) of the Apishapa Focus needs to be statistically tested and the reasons for the variability between Apishapa Focus structural remains resolved. The role of climate change in the depopulation of the area after AD 1300 can be examined through detailed environmental analysis of Middle Ceramic archeological sites. While there are postulated models to describe the relationships between the Apishapa Focus and the later Optima and Antelope Creek Foci (of the Panhandle Aspect) and the even later Great Bend Aspect, these models should be tested as more data becomes available.

In the Historic Period, several research questions exist. The archeological record contains evidence for the cultural and technological transformation of horticultural groups into horse nomads. This record of culture change for the Dismal River Aspect remains untapped. Archeologists need to identify (to the tribal level) the various cultural groups living in Colorado during the Ethnohistoric Period. The date of each tribe's arrival into the state remains an unresolved problem. In

addition, the architecture and technology of the Dismal River Aspect can be defined by excavating and analyzing Dismal River settlements in the eastern Plains.

The Historic Euroamerican occupation of the Pueblo area documents the development of local agriculture, ranching, and mining activities. Unfortunately, few historic archeological research questions have been prepared on either the state or local level. There exists a large number of potential research questions for historical archeological resources. For example, the development of settlement patterns and economic networks in an essentially frontier area is a geographical/archeological topic amenable to modeling, computer simulation, and testing with historical site information. Using diverse documentary and archeological data, it is possible to make acculturational studies focusing on the interaction of Native American and Euromamerican groups. Diachronic changes in settlement and subsistence patterns can be studied from a historical archeological perspective. While usually employed in the study of prehistoric archeological resources, this topic can be applied to historic archeological resources as well. Agricultural settlement and isolated ranch settlement layout can be interpreted from structural remains, and analyses of the historical artifacts at these places provide the economic and social positions of the settlements with respect to each other.

AN ASSESSMENT OF ARCHEOLOGICAL RESOURCE
PRESERVATION AND SURVEY ADEQUACY

3.1 ENVIRONMENTAL CONSTRAINTS TO SITE PRESERVATION

Cycles of deposition and erosion can protect and then remove all or portions of archeological resources. From a management point of view, it is important to recognize places where archeological resources can be found in protected deposits that have not been eroded. This section is a discussion of the environmental factors affecting the preservation of archeological resources on the Pueblo Depot Activity.

As stated earlier (Section 2.1.1), the physiographic structure of the Pueblo Depot Activity area resulted from geomorphic processes beginning in the late Cretaceous and extending into the Quaternary (Trimble 1980). Bedrock surface, topography, and drainage patterns in the Pierre Shale and lower Dakota Sandstone (Scott et al. 1978) were formed during erosion and downcutting that began in the Early Pliocene. Downcutting during the later Quaternary has been interrupted many times when the major drainage base level was stabilized long enough for significant deposition to occur. These depositional episodes left the Nussbaum Alluvium, the Rocky Flats Alluvium, the Verdos Alluvium, the Slocum Alluvium, the Louviers Alluvium, the Broadway Alluvium, the Piney Creek Alluvium and Post-Piney Creek Alluvium, in the valleys of the Arkansas River and its major tributaries.

Quaternary deposits on the Pueblo Depot Activity property are the Verdos Alluvium, the Slocum Alluvium, the Broadway Alluvium, the Piney

Creek Alluvium, and the Post-Piney Creek Alluvium. The Slocum, Piney Creek and Post-Piney Creek deposits are concentrated along Chico Creek. The other drainages (Haynes Creek and Boone Creek) have removed all Quaternary deposits, leaving the Pierre Shale bedrock. Most of the central part of the depot is overlain by the Verdos Alluvium (Scott et al. 1978). Eolian sands that date from the Pinedale glaciation of the Holocene, cover portions of the northeast corner and the extreme southwest corner of the depot. These sands cover earlier deposited alluvial deposits.

Water erosion is relatively severe near the drainages in the Depot; archeological resources located near the drainage systems are affected by current erosion. Wind erosion is a significant problem with certain soils (see Section 2.1.1). Wind erosion becomes more severe when the ground surface is disturbed (by construction, for example) and not stabilized.

Given these geomorphic facts (and the dates of the alluvial deposits), no archeological sites with covered (protected) deposits and physical integrity will be found where the Pierre Shale bedrock is exposed. If sites are located here, they will be only surface sites. The Verdos and Slocum Alluvium are Pleistocene deposits that antedate the appearance of human groups in North America. Any archeological sites found in these deposits cannot have integrity.

Quaternary deposits that have the strongest probability of containing archeological sites are the Piney Creek Alluvium, the Post Piney Creek Alluvium, and the eolian sands. The Late Pleistocene/Early Holocene eolian sands could contain archeological sites dating from the Paleo-Indian period and later. Piney Creek Alluvium is associated with Plains Archaic sites and Post Piney Creek Alluvium is associated with Plains Woodland and Plains Village materials. Archeological sites in these alluvial and eolian deposits will be protected as long as later erosional cycles have not cut into or exposed the buried archeological materials.

3.2 HISTORIC AND RECENT LAND USE PATTERNS

Construction activities associated with the development of the Pueblo Depot Activity have accelerated the rate and intensity of local surface and subsurface ground disturbance. At this time, approximately 41 percent of the ground surface within the Depot's property has been disturbed by building construction. A total of 9337 acres of the Depot's 22,654 acres have been disturbed by 30 separate ground disturbance activities. These activities vary in their depth of disturbance and the amount of the total area disturbed (Table 3-1, Figure 3-1). In addition to the ground disturbance activities listed in Table 3-1 and shown in Figure 3-1, unimproved roads follow many section lines within the Depot. Two reservoirs have been created by damming two small drainages of the facility.

No archeological excavations have affected the ground surface of the Pueblo Depot Activity. Unauthorized collecting of prehistoric artifacts has occurred on Depot property at least since the 1940s.

Whether introduced by human groups or natural phenomena, erosion and ground disturbances adversely affect the integrity of archeological sites. Both types of activities must be recognized during depot planning to insure that archeological resources are effectively managed.

3.3 PREVIOUS CULTURAL RESOURCE INVESTIGATIONS: COVERAGE AND INTENSITY

No cultural resource investigations have occurred on the property of the Pueblo Activity Depot. The Depot's environmental assessment (Inland Pacific Engineering Company 1982) lists no specialized environmental studies that could be useful to archeological studies.

3.4 SUMMARY ASSESSMENT OF DATA ADEQUACY, GAPS

Cultural resources could occur on the Pueblo Depot Activity property in those portions of the facility unaffected by previous ground

Table 3-1 A SUMMARY OF HISTORIC AND MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE
BASE ON THE PUEBLO DEPOT ACTIVITY

GDA No. ^a	Type of Distur- bance	Date Con- ducted (yr)	Reference	Area Dis- turbed (acres)	Esti- mated Depth Below Surface	Ratio of Dis- turbed to Total Area	Location of Disturbed Area				USGS Quad Sheet	Coinci- dental Site
							UTMb	North- ing	East- ing	Legal ReferenceC		
1	North Demoli- tion Area	1940s- 1980s	Office of the Facilities Engineer Tooele Army Depot (1983)	7.2	6-10 ft	1:1		T19S	R62W	31	NA76074	NA
2	North Burning Area No. 1	1940s- 1980s	Office of the Facilities Engineer Tooele Army Depot (1983)	25.8	6-10 ft	1:1		T20S	R62W	6	NA76074, D76074	NA
3	North Burning Area No. 2	1940s- 1980s	Office of the Facilities Engineer Tooele Army Depot (1983)	25.8	6-10 ft	1:1		T20S	R62W	6	NA76074, D76074	NA
4	Burial of Mustard Chemical Materials	1940s- 1980s	Office of the Facilities Engineer Tooele Army Depot (1983)	20.1	6-8 ft	1:1		T20S	R62W	7	NA76074	NA
5	Demolition of Contam- inated Waste	1940s- 1980s	Office of the Facilities Engineer Tooele Army Depot (1983)	18.6	6-8 ft	1:1		T20S	R62W	18	NA76074, D76074	NA

GDA No.	Type of Disturbance	Date Constructed (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area	Location of Disturbed Area				USGS Quad Sheet	Coincidental Site	
							UTM ^b	Legal Reference	UTM ^b	Legal Reference			
6	Construction of Ammunition Disassembly Plant buildings and road	1950-1959	Pueblo Army Depot Activities Engineer (n.d.)	18.6	3-6 ft	4:10	North- ing	East- ing	Town- ship	Range	tion	NA76074	NA
7	Construction of Ammunition Work- shop buildings fuel stor- age tanks, railroad tracks, a leaching bed, and a waste lagoon	1958	Pueblo Army Depot Activities Engineer (n.d.)	60.3	3-6 ft	4:10	T20S		T20S	R62W	20	NA76074	NA
8	Construction of a packing pad	1943(?)	Office of the Facilities Engineer Tooele Army Depot (1983)	3.6	3-6 ft	9:10	T20S		T20S	R62W	29	NA76074	NA

GDA No. ^a	Type of Disturbance	Date Constructed (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area	Location of Disturbed Area			USGS Quad Sheet	Coincidental Sites	
							UTM ^b	North- ing	East- ing			Legal Reference ^c
9	Construction of a security station and parking lot	1943(?)	Office of the Facilities Engineer Tooele Army Depot (1983)	3.6	3-6 ft	9:10				T20S R62W 29, 32	NA76074	NA
10	Construction of a community area with an outdoor swimming pool, bath house, a mess hall, storehouse, two work-shops, a road, and parking lots	1943, 1953, 1955	Pueblo Army Depot Activities Facilities Engineer (n.d.)	14.1	6-10 ft	7:10				T20S R62W 28	NA76074	NA
11	Construction of a park, roadway, flag pole, and parking lot	post-1942		11.7	.5-3 ft	5:10				T20S R62W 28	NA76074	NA

GDA No.	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area	Location of Disturbed Area				USGS Quad Sheet	Coincidental Site	
							UTM ^b	Legal Reference ^c	Section	Range			
12	Construction of maintenance shops, storage buildings, a heating plant, railroads, roads, truck loading facilities and engineering facilities	1942-1943	Pueblo Army Depot Activities Engineer (n.d.)	60.3	3-6 ft	9:10	North- ing	East- ing	Town- ship	R62W	28	NA76074	NA
13	Construction of four administration buildings (with basements) and roads	1943	Pueblo Army Depot Activities Engineer (n.d.)	3.9	6-10 ft	9:10			T20S	R62W	33	NA76074	NA

GDA No.	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area		Location of Disturbed Area			USGS Quad Sheet	Coincidental Site
								UTMB	North- ing	East- ing	Legal Reference ^c	
14	Construction of seven teen houses, ing units, some with basements, sixteen storage sheds, and roads	1943, 1964	Pueblo Army Depot Activity Facilities Engineer (n.d.)	18.5	6-10 ft	9:10		T20S	R62W	33	NA76074	NA
15	Construction of a landfill, large reservoir, and water pump building	post-1943	Office of the Facilities Engineer Tooele Army Depot (1983)	122.0	6-10 ft	9:10		T20S	R62W	33, 34	NA76074	PDA-5 (PD)
16	Construction of three warehouses, nine storage buildings, roads, and railroads	1943, 1952, 1955, 1963	Pueblo Army Depot Activity Facilities Engineer (n.d.)	148.2	3-6 ft	5:10		T20S	R62W	28, 33	NA76074	NA

GDA No.	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area		Location of Disturbed Area			USGS Quad Sheet	Coincidental Sites	
						7:10	7:10	UTM ^b		Legal Reference ^c			
								North- ing	East- ing				Town- ship
17	Construction of four administration buildings, a machine shop, a computer building, and roads	1942-1943	Pueblo Army Depot Activities Engineer (n.d.)	13.6	3-6 ft	7:10	7:10	North- ing	T20S	R62W	28	NA76074	NA
18	Construction of seven maintenance shops, an engineering facility, a fuel storage area, roads, and railroads	1943, 1958, 1963	Pueblo Army Depot Activities Engineer (n.d.)	47.6	6-10 ft	7:10	7:10	North- ing	T20S	R62W	28	NA76074	NA
19	Construction of twenty-seven warehouses, toilets, miscellaneous buildings, railroads, road trucking, and parking lots	1943, 1958	Pueblo Army Depot Activities Engineer (n.d.)	189.5	3-6 ft	7:10	7:10	North- ing	T20S	R62W	27, 26	NA76074	NA

GDA No.	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area	Location of Disturbed Area					USGS Quad Sheet	Coincidental Sites
							UTM	North- ing	East- ing	Town- ship	Range		
20	Construction of a guided missile maintenance facility, guided missile antenna test site, and roadways	1958	Pueblo Army Depot Activities Engineer (n.d.)	47.4	3-6 ft	3:10			T20S	R62W	27, 28, 34, 33	NA76074	NA
21	Construction of a heating plant and a sewage treatment plant	1961(?)	Pueblo Army Depot Activities Engineer (n.d.)	31.6	3-6 ft	3:10			T20S	R62W	27	NA76074	NA
22	Construction of five guided missile maintenance facilities, two compressed air plant buildings, railroad tracks, and roads	1958, 1961	Pueblo Army Depot Activities Engineer (n.d.)	137.8	3-6 ft	7:10			T20S	R62W	27, 26	NA76074	NA

Com- No.	Type of Distur- bance	Date Con- ducted (yr)	Reference	Area Dis- turbed (acres)	Esti- mated Depth Below Surface	Ratio of		Location of Disturbed Area				USGS Quad Sheet	Coinci- dental Site
						Dis- turbed Total Area	to	UTMB	Legal Reference	Sec- tion	Range		
23	Construc- tion of a vehicle test track, a vehicle maintenance shop and a septic tank drainage field	1963	Pueblo Army Depot Activities Facilities Engineer (n.d.)	107.6	3-6 ft	3:10		North- ing	East- ing	Town- ship	R62W	34 NA76074	NA
24	Construc- tion of a five build- ing sewage treatment plant	1943	Pueblo Army Depot Activities Facilities Engineer (n.d.)	35.5	6-10 ft	9:10					T20S	35 NA76074	NA
25	Construc- tion of 1,516 am- munition storage ig- loos, rail- road tracks, roads, 74 safety shel- ters, 23 un- loading/load- ing docks, 4 water wells, 4 dunnage buildings, security buildings, high explosive magazines, and rock, etc.	1943, 1958, 1959, 1962, 1963	Pueblo Army Depot Activities Facilities Engineer (n.d.)	7569.6	3-6 ft	9:10					T20S	3,4, NA76074 9,10, 15,16, 5,8, 17,21, 22,2, 11,14, 23	NA
											T19S	R62W 33,34, 32,35	

GDA No. a	Type of Disturbance	Date Conducted (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area		Location of Disturbed Area				USGS Quad Sheet	Coincidental Site
								UTM	North- ing	East- ing	Town- ship	Range	Coincidental Site
26	Construction of 12 ammunition renovation shops, 3 store-houses, railroad tracks, roads and parking lots	1943, 1958, 1963	Pueblo Army Depot Activities Engineer (n.d.)	299.59	3-6 ft	6:10					T20S	R62W 22, 23	NA76074 NA
27	Construction of six liquid propelled storage buildings, an ammunition renovation shop, railroad tracks and roads	1956, 1963	Pueblo Army Depot Activities Engineer (n.d.)	60.8	.5-3 ft	4:10					T20S	R62W 23	NA76074 NA
28	Construction of Linda Ann Reservoir	1943(?)		44.2	6-10 ft	8:10					T20S	R62W 23	NA76074 PDA-9 (PD)

GDA No.	Type of Disturbance	Date Constructed (yr)	Reference	Area Disturbed (acres)	Estimated Depth Below Surface	Ratio of Disturbed to Total Area	Location of Disturbed Area				USGS Quad Sheet	Coincidental Site
							UTMB	North- ing	East- ing	Legal Reference		
29	Construction of three ammunition renovation shops, a guided missile maintenance facility, three septic tank drainage fields, and roads	1968(?)		45.9	3-6 ft	3:10		T20S	R62W	24	NA76074	NA
30	Construction of three ammunition demolition facilities, an observation tower, and a roadway	1963(?)		144.9	.5-3 ft	2:10		T20S	R62W	13, 14, 23, 24	NA76074	NA

^aGround Disturbance Areas (GDAs) as mapped in Figure 3-1.

^bUTM = Universal Transverse Mercator coordinates, Zone 13. If the area is less than 10 acres in extent, the coordinates record the approximate center of the site. If it is larger, they record the corners of a 3-or-more sided figure that encloses the site. Such corner designations are listed in a clockwise sequence beginning with the northwest corner (e.g., NW, NE, SE, SW).

^cIf area lies in two or more sections, then the section that accounts for most of the area is listed first.

^dNA76074 = North Avondale, CO, 7.5 min. sheet (1960, photorevised 1974);
D76074 = Devine, CO, 7.5 min. sheet (1960, photorevised 1974).

^eNA = not applicable
PD = partially destroyed

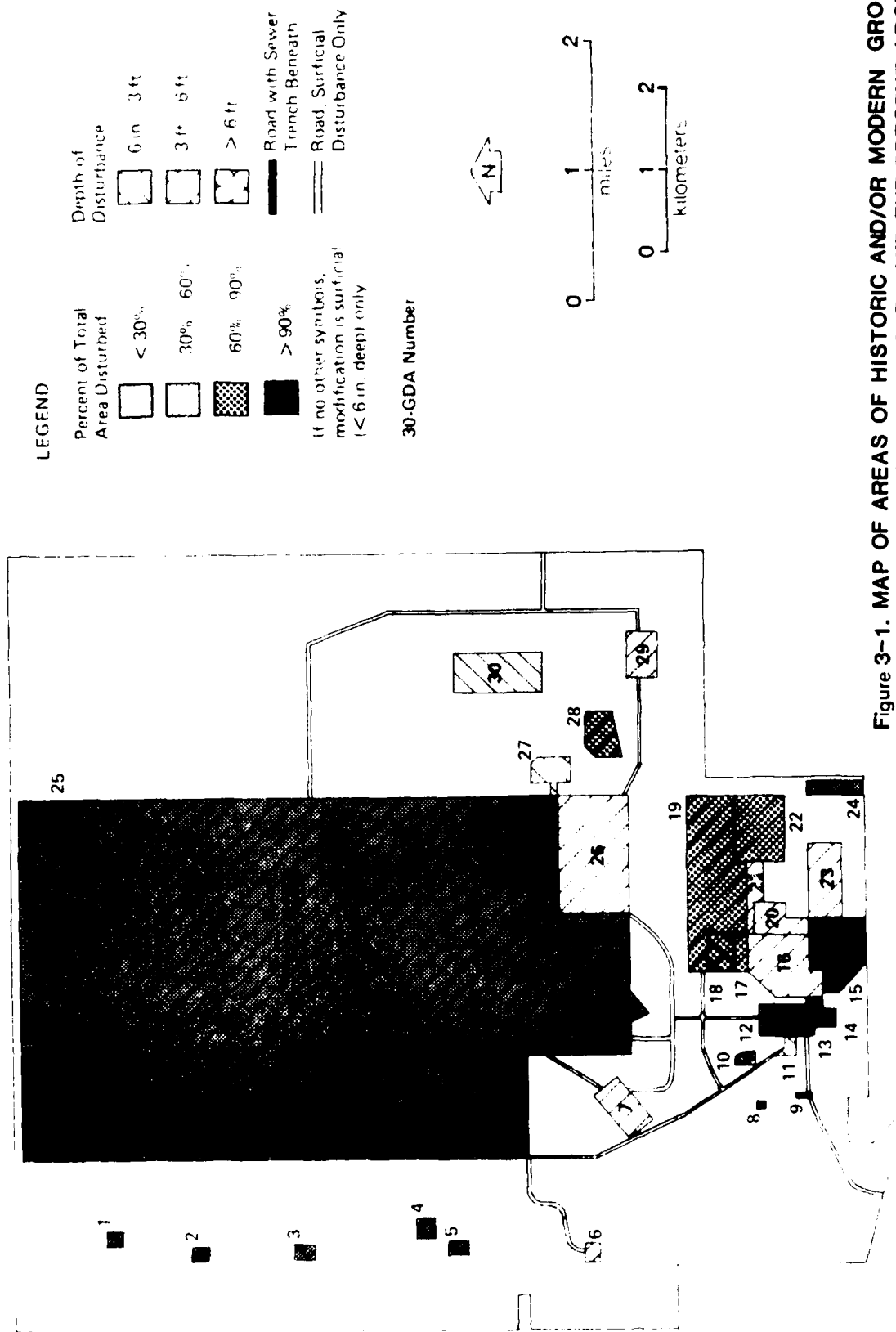


Figure 3-1. MAP OF AREAS OF HISTORIC AND/OR MODERN GROUND DISTURBANCE THAT MIGHT LIMIT THE PRESENT ARCHEOLOGICAL RESOURCE BASE ON THE PUEBLO DEPOT ACTIVITY

disturbance activity (see Figure 3-1). The fact that no cultural resources have been formally recorded at the depot results from the lack of cultural resource surveys. Given archeological survey work in the region (for example, Anderson and Hall 1977; Buckles 1980a), there is a high probability for the existence of cultural resources on the Depot. There are several landforms that could contain cultural resources as long as natural and recent land disturbance have not affected the integrity of the geological deposits. Ridges covered with eolian sand and overlooking drainages, lower ridges paralleling intermittent drainages, and blow outs will be the landforms most strongly associated with archeological resources.

POTENTIAL ARCHEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

This chapter is a description of the potential archeological resources located within the boundaries of the Pueblo Depot; research and management implications are listed in Table 4-1 and discussed in the text. Only potential resources (those described by informants or obtained from archival information) are presented here because there are no known archeological sites on the facility.

Several past and presently employed civilian Pueblo Depot Activity employees provided the following information concerning potential archeological resources on the depot property. Ten potential prehistoric sites were identified (Table 4-1). The location of these ten potential archeological resources is given in Table A-1 and mapped in Figure A-1.

Except for one location (PDA-2), all of the prehistoric archeological resource locations are reported to be lithic scatter sites containing lithic manufacturing debris as well as finished and broken lithic tools. Ground stone tools (manos and metates) were also mentioned as occurring at several of these sites. All of the prehistoric sites are now eroding. One site (PDA-6) contains features that are also eroding. The informants maintained that the features are "Indian burial grounds," but these features are more likely to be hearths.

Potential archeological resource PDA 2 is a place where demolition occurs frequently. A collector recovered the basal fragment of a Folsom projectile point from this area after a series of demolition activities

TABLE 4-1. POTENTIALLY IDENTIFIABLE BUT NOT PRESENTLY RECORDED
 ARCHEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

Site No. ^a	Reference ^b	Description	Research ^c Value CR
PDA-1	Papovich	Prehistoric lithic	2
PDA-2	Thomas	Prehistoric lithic scatter; Folsom base fragment	2
PDA-3	Thomas	Prehistoric lithic scatter	2
PDA-4	Thomas	Prehistoric lithic scatter	2
PDA-5	Thomas	Prehistoric lithic scatter	2
PDA-6	Papovich and Thomas	Prehistoric lithic scatter with eroding hearth features	2
PDA-7	Francis	Prehistoric lithic scatter	2
PDA-8	Thomas	Prehistoric lithic scatter	2
PDA-9	Thomas	Prehistoric lithic scatter	2
PDA-10	Francis	Prehistoric lithic scatter	2

^a Site numbers were assigned by the author within the context of this overview and management plan. The numbers were sequentially assigned across the facility. Table A-1 provides their locational information, and they are illustrated in Figure A-1.

^b All are personal communication, 1983.

^c Confidence Rating (CR) of the potential resource base's research value is a general assessment of the sites physical integrity and value. The CR ranges from 1) resource may have little value and/or the information about it may be unreliable to 3) resource may have high research value and the information about it is reliable.

(Otto Thomas, personal communication 1983). Although demolition activities have disturbed this site, buried portions of it may still be protected.

While the potential archeological resource location PDA-2 can be classified as a Folsom Paleo-Indian site location, the remaining nine lithic scatters cannot be assigned with certainty to an archeological period or tradition. No diagnostic projectile point types or ceramic types have been identified at these sites. The only documented diagnostic artifact comes from a private collection made from PDA-2 (Table 4-2). Since the potential archeological resources have not been examined in the field, there is no information concerning their estimated depth below the ground surface. The location of the potential archeological resources (Figure A-1) does suggest that archeological sites tend to occur on high ridges overlooking drainages and on low ridges along the minor creeks draining the Arkansas River.

There are no presently recorded historic archeological resources on the facility. It is unknown whether sites exist, but in the absence of substantive archival data, their existence cannot be ruled out until such a study is conducted.

TABLE 4-2. PRESENTLY KNOWN ARTIFACT, ECOFACT, OR DOCUMENTARY COLLECTIONS FROM ARCHEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

Site Number, Name	Collection Characteristics							
	Collection Location		Artifact		Ecofact		Documentary	
	Curatorial Repository	Accession Number	Brief Description	Size/No.	Brief Description	Size/No.	Brief Description	Size/No.
PDA-2	Otto Thomas ^b	None	Basal fragment	1	None	None	None	None

^a Potential resource locations are mapped in Figure A-1.

^b Pueblo, Colorado (privately held).

AN ASSESSMENT OF THE SIGNIFICANCE OF THE ARCHEOLOGICAL
RESOURCE BASE ON THE PUEBLO DEPOT ACTIVITY

Up to this point, the archeological resources on the Pueblo Depot Activity have been summarized in a descriptive manner. This section synthesizes the previous information and provides the cultural resource planner with important research values for the potential archeological resources on the Depot. Two major topics are developed here: section 5.1 presents the analytical criteria for assigning research values in the potential archeological resource base; section 5.2 discusses ideal goals and objectives for implementing future archeological research.

5.1 THE SIGNIFICANT RESOURCE BASE

Cultural resources must be organized into categories that reflect values of importance for scientific research questions, or scaled values of current sociocultural concerns. The potential archeological resources of the Pueblo Depot Activity are categorized by major cultural/temporal periods and thematic units within those periods (Table 5-1).

The lack of recorded archeological resources on the Pueblo Depot Activity reflects the fact that no cultural resources surveys have been undertaken on the property. From this standpoint, all cultural resources located on the Depot have a relatively high research value (Table 5-1), since they potentially contribute basic information concerning the prehistory and history of the area.

Highest research values are assigned to Selby-Dutton period, Folsom period, and Early Archaic period prehistoric archeological resources.

TABLE 1. SUMMARY OF KNOWN AND ARCHAEOLOGICAL REMAINS ON THE PIERCE DEPOT ACTIVITY

Type Occurrence ^d										
Reported Type	Location	Resource Type	Known Occurrences (No.)	Potential Occurrences (No.)	Other Likely Occurrences	Socio- cultural Association	Landform Associa- tion	Physical Integrity	Research Value (P)	Socio- cultural Value (S)
Military Depot	Various	Military Base, tanks, armies, cannons	0	0	++	Euroamerican	Valley	Fair	3	3
	Sugar Beet Alfalfa Farming	Larger farm build- ings, ranch buildings	0	0	-	Euroamerican	Valley	Poor	4	3
	Farming (livestock)	Stockyard	0	0	-	Euroamerican	Plain and Tableland	Poor	4	3
	Other Large Buildings	Individual Large Build- ings	0	0	-	Euroamerican	Plain and Tableland	Poor	4	3
Military Depot	Various	Campsite	0	0	-	Euroamerican	Valley	Fair	4	3
	Various	Campsite	0	0	-	Euroamerican	Valley; minor drainage	Fair	4	3

Table 1-1 (cont.) SUMMARY OF SIGNIFICANT ARCHAEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

Site Occurrence ^a									
Region	Thematic	Seasonal	Occurrence	Essential	Other	Socio-cultural	Landform	Physical	Socio-cultural
						Association	Association	Integrity	Value
Middle	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
Middle	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
Middle	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2
	Seasonal	Seasonal	0	0	+	Native	Drainage	Fair	5 3 4 2

TABLE 1. SUMMARY OF KNOWN AND POTENTIAL ARCHAEOLOGICAL RESOURCES ON THE PUEBLO DEFOT ACTIVITY

Resource Name	Type Occurrence ^a					Landform Association	Physical Integrity	Research Value ^b	RV CR ^c	Socio-cultural Value	SCV CR ^c
	Resource Type	Known Occurrences (No.)	Potential Occurrences (No.)	Other Likely Occurrences	Socio-cultural Association						
1. Seasonal Hunting/Gathering Site	Campsite, habitation site	0	0	+	Native American	Rock-shelter canyon, floodplain	Fair	4	3	3	2
2. Seasonal Hunting/Gathering Site	Campsite, burials	0	0	-	Native American	Rock-shelter	Fair	4	3	3	2
3. Seasonal Hunting/Gathering Site	Campsite, limited activity site	0	0	+	Native American	Terrace/bench parallel to drainage	Fair	5	3	3	2
4. Kill and Butcher Site	Kill and butcher site	0	0	+	Native American	Arroyo, dune	Fair to poor	4	3	3	2
5. Kill and Butcher Site	Kill and butcher site	0	1	++	Native American	Blowout, arroyo	Fair to poor	5	3	3	2

Type A...

Species	Sex and Age	Known Coordinates	Potential References (No.)	Other Likelihood of occurrence	Location	Condition Assessment	Physical Injury	Research Value	RV CR	Socio-cultural Value	SC CR
Red-tailed Tropicbird	Male and Sub-adult		0		Native American	Badly Sprung	Fair	4	3	3	2
Red-tailed Tropicbird	Male and Sub-adult		0		Native American	Badly Sprung	Fair	5	3	3	2

the study, a previously known or potential archaeological occurrence of this type is specified here. In addition, a judgement has been made as to whether or not the above members of the population are within the scope of the study. Based on an analysis of the ethnohistoric or historic literature, the study has drawn a judgement as to the likelihood of presence of the phenomenon. The probability of these additional occurrences has been estimated as a percentage of the population of the study area.

the data are the outcome of the specified treatment. For a resource class, it is an evaluation of the class' quality. The quality of the resource class is primarily determined by the quality of diagnostic relationships, the quality of the treatment, and the quality of the data used to discern patterns among the data. Based on the quality of the data, the quality of the data is categorized into five (high) values, including "A" if such a high quality, "B" if the quality is good, "C" if the quality is fair, "D" if the quality is poor, and "E" if such a low quality.

the results. Despite a lack of correlation evidence for the response (F0) or sociocultural (F1) values of the two groups, the results of the present study suggest that scores, and likely not to be reliable, and the judgment is moderately reliable.

As a result of the above, the average value of the recovery value (AV) of the system is calculated by the following formula:

These materials are crucial resources for determining early human adaptations to the region, and they have a strong probability of occurring on the facility property. Folsom materials are particularly prevalent in blow-outs near the Depot area (John Beardsley, personal communication 1983), and there is one potential Folsom archeological site on the facility property.

The highest research value was also assigned to historic Native American cultural resources. These resources have a good probability of occurring on Depot property, and they represent an episode of significant subsistence change (pedestrian hunting/gathering/horticulture to equestrian hunting/gathering) within a relatively short period of time. The historic Native American cultural resources also offer an opportunity to correlate named tribes with certain items of material culture, types or locations of sites, and burial practices.

Archeological resources from the Clovis, Plano, Middle and Late Archaic, and Early and Middle Ceramic periods were assigned very high research values. Information obtained from these archeological resources will enhance the incomplete culture history of the area. Because they are now located on federal property, any sites from these cultural/temporal periods may be relatively intact as long as they have not been severely eroded.

Pueblo has had a rich history and it is expected that any historic archeological resources can add to the historical knowledge of the area. Some gaps still remain in the regional history, and any historical resources in or near the Pueblo Depot Activity may provide significant information which could reinforce, or even change, the region's history as presently known. It is relatively unlikely for historical resources to be found on the facility, however. The only historic resource, a ranch house and buildings, is nearby and not on the facility property. This ranch building was probably the house location for the large ranch property taken by the United States government in the early 1940s.

The sociocultural values given to the archeological resources in Table 5-1 are difficult to assign with high confidence. Prehistoric archeological resources may be significant to Native American groups today, but it is extremely difficult to trace direct cultural relationships from the prehistoric past. This task is compounded further by the fact that most of the Native Americans no longer live in the eastern Colorado Plains. Archeological resources of the early historic Native Americans have a higher sociocultural value because these resources could potentially be assigned to a named Native American tribe still living near the area. High sociocultural values were assigned to historic Euroamerican archeological resources because many of the descendants of the earlier settlers still live in the area.

Physical integrity of the archeological resources on the Pueblo Depot Activity (Table 5 1) is difficult to predict, due to the large facility area, the differences in ground disturbance, and the variability in geomorphic settings and past geomorphological processes. Erosion is a problem in almost all areas of the Depot, so no resource was given a physical integrity value higher than "fair." Historic structural sites, if found, are assumed to be in poor condition, since any older historic buildings were probably bulldozed when Depot construction began. No historic structures presently exist on any facility maps.

5.2 IDEAL GOALS AND OBJECTIVES

Given the assumption that significant (and presently unidentified) archeological resources appear to be located on the Pueblo facility property, the following is an outline of a desirable program to manage these resources for the best preservation or use of their research and sociocultural values. An ideal facility archeological resource management program would encompass identification, evaluation, conservation, excavation and analysis, and interpretation activities. It would emphasize the conservation of significant resources, and their excavation or "use" only to mitigate any unavoidable destruction or

damaging activities or in search of important information that is being collected and studied within a well designed research project.

Since no archeological resource surveys have been conducted on the facility property, but the periodic unsystematic collection of artifacts has occurred, the first step in developing a management program is field identification of the ten prehistoric sites predicted to be there. Such an identification program should begin with more intensive and extensive review of archival prehistoric information, as well as a review of oral and archival historic information. The focus of this preliminary review would be to evaluate the prehistoric information base presently available and evaluate the significance of any materials that might be left on the facility. This would complement the more extensive evaluations of geomorphological and natural resource distributions presented within this report as the basis of evaluating the distribution and potential significance of any prehistoric archeological resources there. Further, this preliminary historical archival review would focus on evaluation of the historical information base presently available without recourse to any historical archeological investigations and, through consultation with professional historians and people with personal ties to the 1940s pre-facility area occupants, evaluate the historic significance of any materials that might be left on the facility.

The next stage of the identification program would be the field inventory of the undisturbed portions of the facility to identify the surface evidence of any prehistoric or historic archeological sites. Such an identification project would include the pedestrian survey of the facility, with close interval spacing of survey transects. Large scale aerial photographs and detailed topographic maps should be used for field reference. Standard forms for recording the surface characteristics of identified prehistoric and historic resources should be completed as part of the inventory procedures and the area and methods of the survey should be well documented. The preferred survey policy for most contemporary projects is to make only minimal collections of artifacts off of site

surfaces, retaining a representative sample including artifacts that are diagnostic of particular styles and/or technologies or are immediately vulnerable to non-professional collection or damage. Any collected materials should be fully described and appropriately curated.

In addition to a description of the surface evidence of these sites, the ideal inventory would include some kinds of subsurface investigation (e.g., augering, test excavation, remote sensing) to evaluate the contents, extent, and integrity of the identified resources. Finally, this stage should include an identification of the important research or other values inherent in the inventoried sites, both as a basis for the development of future research designs as well as for the evaluation of management options should the resource be threatened with damage or destruction by non-archeological research activities. For purposes of future research development, the identification and evaluation of the resources needs to be well documented and available to the research community. For future resource management purposes, it needs to be appropriately stated within the U. S. Department of the Interior's terminology and concepts of resource significance.

The prevailing professional approach to archeological resources for the past decade has been one of conservation (Lipe 1977:21)--"Our goal...is to see that archaeological resources everywhere are identified, protected, and managed for maximum longevity." Thus, the ideal objective is to develop a "bank" of significant sites that may be investigated through a variety of techniques, including destructive excavation, only as part of well designed research projects that are scheduled within a regional research program that seeks to maintain the overall range of undisturbed sites for future use. A corollary to this is that the sites should be allowed to be investigated by scientists in a non-reactive situation (i.e., not threatened with immediate destruction of the resource). Such basic investigation of resources on the public lands should be conducted only within research designs that are appropriate to the contemporary regional or broader study questions. It should also be

conducted only within a program that includes long-term protection of the information collected from the resources, and a commitment to the public dissemination of that information.

If an archeological site evaluated as being of research or sociocultural significance is going to be damaged or destroyed, the ideal objective would be to preserve its included materials and information values through a data recovery program. Such a program would be little different from the non-reactive investigations discussed above, but is likely to be conducted in conjunction with requirements for facility development. Again, an important element in such an emergency research program would be the adequate analysis, curation, and publication of the recovered information.

In the event the Pueblo Depot Activity has accomplished its Section 106 procedures and finds a previously unidentifiable resource during the ground disturbance or construction phase, the installation will effect compliance using 36 CFR 800.7 procedures.

Thus, in summary the ideal goals for the management of the Pueblo Depot Activity archeological resources are to:

- Inventory and evaluate all the resources on the facility
- Conserve the significant sites, allowing their research use only within a regional research design
- Recover the contents and information from any significant resources threatened by damage or destruction
- Provide the public with the substance of the information values that are inherent within or collected from the facility's archeological resource base.

A RECOMMENDED ARCHEOLOGICAL MANAGEMENT PLAN
FOR THE PUEBLO DEPOT ACTIVITY

Given the known and potential cultural resources on the Pueblo Depot Activity, the following management plan provides the basis for explicit and appropriate decisions concerning probable impacts on cultural resources. The sections that follow outline the Pueblo Depot Activity Master Plan, appropriate goals, an estimated scope of work and associated costs for the identified management needs.

6.1 FACILITY MASTER PLANS AND PROPOSED IMPACTS

Future construction projects at the Pueblo Depot Activity depend on federal appropriations. Federal appropriations can come from the annual Operations Maintenance (OMA) funds or from additional funding for special projects. The Military Construction-Army (MCA) funding and Military Construction Army Reserve (MCAR) funding are examples of additional construction funding mechanisms. Other special construction projects for the Depot can be submitted directly to the Department of the Army for consideration of funding.

A summary of on-going and planned ground disturbing activities (Table 6-1) includes the possible impacts upon the cultural resources that could occur in or near the ground disturbing activity. These activities are documented in the Pueblo Depot Activity Master Plans (Tooele Army Depot 1983) and in other reports (Pueblo Depot Activity 1982; Tooele Army Depot 1982). Conversations held with the Facility Engineer staff at Pueblo Depot Activity provided additional technical information concerning the planned ground disturbing activities.

TABLE b-1. A SUMMARY OF ONGOING AND PLANNED ACTIVITIES ON THE PUEBLO DEPTO ACTIVITY THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

TABLE b-1. A SUMMARY OF ONGOING AND PLANNED ACTIVITIES AT B-1 PCE												
Activities			Ratio of				Associated Resources				Impacts	
Description	Date	Area ^a	Size (acre)	Estimated Depth Below (ft.)	Dis- turbed to Total Area ^b	Resource Class	Resources known or Predicted ^d	NRHP Status ^e	Other Value ^f	Direct	Indirect	Mitigation Options
Construct Drill and Transfer System (DATs)	1983	A	n.d.	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Proposed construction of Toxic Materials Cave and Preservation/ Surveillance Building	n.d.	B	n.d.	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Proposed construction of Chemical Change house	1983	C	4500SF	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Proposed security upgrade for sensitive areas and perimeter	1986	D	n.d.	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Proposed modification to a trap door and drains	1987	E	n.d.	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA

TABLE 6-1 (Cont.) A SUMMARY OF ONGOING AND PLANNED ACTIVITIES ON THE PUBLIC DEPOT ACTIVITY THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

RESOURCES		Activities		Associated Resources					Impacts			
Description	Date	Area ^a	Size (acre)	Estimated Depth Below Surface (ft.)	Ratio of Disturbed to Total Area	Resource Class	Resources known or Predicted	NRHP Status	Other Value	Direct	Indirect	Mitigation Options
Construction of proposed Container Loading Pad	1986	F	30,000SF	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Construction of proposed Ammunition Handling Building	1987	G	12,000SF	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Construction of proposed Ammunition Surveillance Workshop	1987	H	17,171SF	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA
Proposed construction at Surveillance Test Range	1983	I	n.d.	n.d.	n.d.	Plains Village Plains Woodland Plains Archaic	L L L	INSF INSF INSF	No No No	Destroy Resources Destroy Resources Destroy Resources	Area more accessible Area more accessible Area more accessible	Data recovery and protection Data recovery and protection Data recovery and protection
Construction of proposed loading facility for coal	1986	J	70000 3100Y	n.d.	n.d.	NA	NA	NA	NA	NA	NA	NA

TABLE 6-1 (continued) A SUMMARY OF ONGOING AND PLANNED ACTIVITIES ON THE PUEBLO DEPOI ACTIVITY THAT COULD AFFECT ARCHEOLOGICAL RESOURCES

Activities			Associated Resources				Impacts				
Description	Date	Area ³ (acres)	Size (acres)	Ratio of Dis- turbed Depth to Surface (ft.)	Resource Class	Resources known or Predicted ^d	NRHP Sta- tus	Other Value ^f	Direct	Indirect	Mitigation Options

³ Locations of these areas are mapped in Figure 6-1.

⁴ Not all the ground within the boundaries of an on-going or proposed activity area will necessarily be affected. This Ratio is an evaluation of the acres of surface projected to be disturbed within a proposed activity area in proportion to the overall size of the area itself.

⁵ This is a synthetic statement of temporal unit + thematic unit + resource type, as presented in Table 5-1.

⁶ This is an identification of the known (K) or Potential (P) resources that are located within the proposed activity area, as well as the positive (+) chance that presently unknown resources are likely (L) to be found there.

⁷ The National Register of Historic Places (NRHP) status of the resource is identified by the following code. IHSF = insufficient information available by which to make a judgement.

⁸ Other values may include concerns such as traditional Native American religious significance, local zoning requirements.

⁹ Direct impacts are those whose ground-disturbing activities will directly damage or destroy the identified resource.

¹⁰ Indirect impacts include activities such as vandalism because of increased knowledge of a resource, increased erosion of a resource because of projected activities (e.g., loss of vegetative cover), or loss of structural integrity of surface or buried structural elements because of increased traffic vibration.

Presently, the Pueblo Depot Activity has ten planned or proposed ground disturbing activities (Table 6-1, Figure 6-1). The majority of these involve the construction of small facilities such as buildings, loading pads, and workshops. Two large projects involve the upgrading of present storage (igloo) structures and security measures, and one project will expand an ammunition test range. Two projects are now underway: Project PR 503-81, surveillance test range (I, Figure 6-1) and the Drill and Transfer System ("DATS;" A, Figure 6-1). All of the projects except one (Table 6-1), are located in an area of previous ground disturbance (GDA 25, Figure 3-1). The one exception is the surveillance test range project (I, Figure 6-1), which is located between GDA 29 and GDA 30.

6.2 APPROPRIATE ARCHEOLOGICAL MANAGEMENT GOALS WITHIN THE PUEBLO DEPOT ACTIVITY'S MASTER PLAN

6.2.1 General Facility Planning Needs

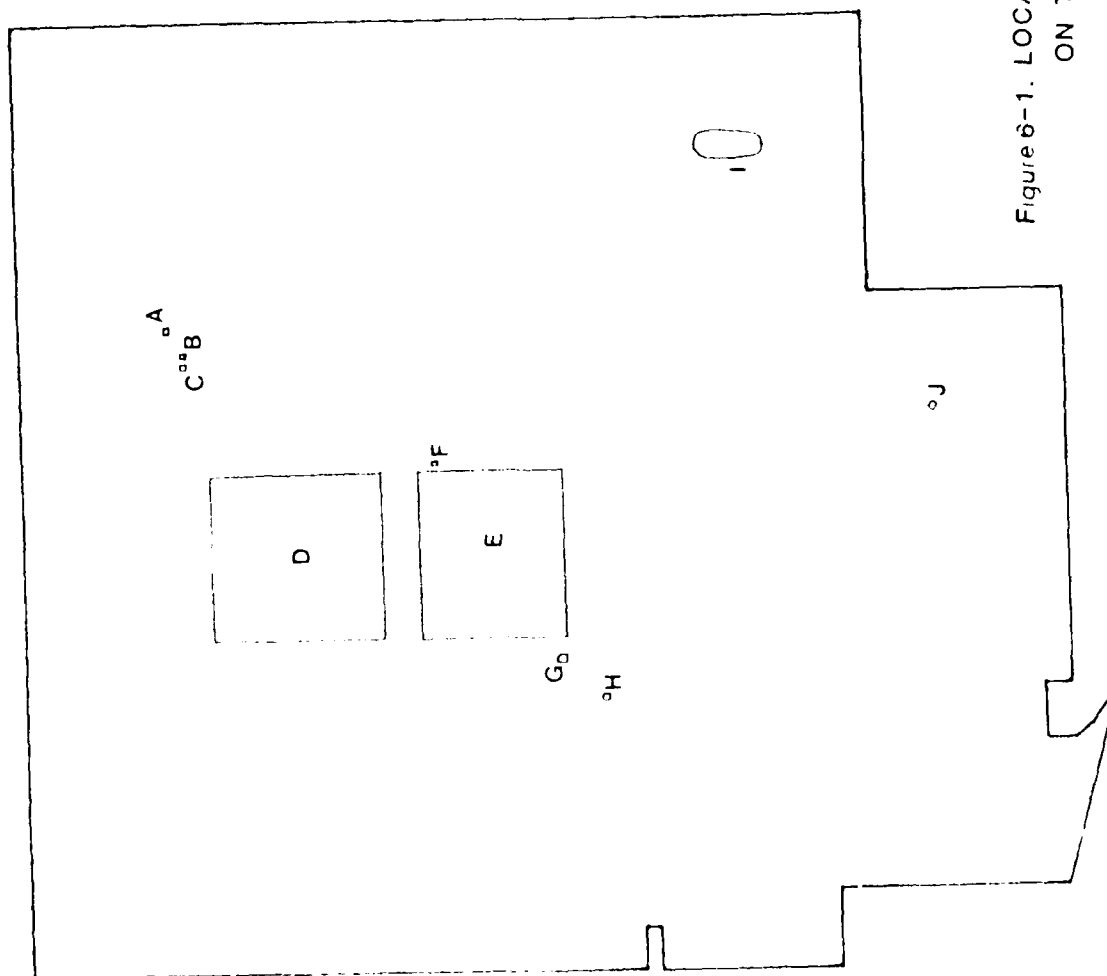
Army Regulations 420-40, drafted pursuant to the National Historic Preservation Act and 36 CFR 800 (Section 1.1), require that each DARCOM installation have a Historic Preservation Plan or have documentation on file indicating that there are no installation resources appropriate to such management planning. There is presently no such negative declaration, and at least ten potential archeological sites are presently known on the facility. Thus, the present report is organized so as to provide a basis for such a plan to be developed and implemented on the facility.

The Department of the Army AR 420-40 regulation prescribes Army policy procedures and responsibilities for compliance with the National Historic Preservation Act of 1966, as amended; for the maintenance of state-of-the-art standards for preservation, personnel and projects; and for accomplishment of the historic preservation program. The Historic Preservation Plan has the following objectives:

- Provision of historic and archeological data for the installation's information systems

LEGEND

- A DRILL AND TRANSFER SYSTEM
- B PROPOSED TOXIC MUNITION WAREHOUSE AND PRESERVATION/SURVEILLANCE BUILDING
- C PROPOSED CHEMICAL CHANGE HOUSE
- D PROPOSED SECURITY UPGRADE FOR SENSITIVE ARMS AND AMMUNITION
- E PROPOSED MODIFICATIONS TO M100C DOORS AND APERTURES
- F PROPOSED CONTAINER LOADING PAD
- G PROPOSED AMMUNITION HANDLING BUILDING
- H PROPOSED AMMUNITION SURVEILLANCE WORKSHOP
- I SURVEILLANCE TEST RANGE
- J PROPOSED UNLOADING FACILITY FOR COAL



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Figure 6-1. LOCATION OF ON-GOING AND PLANNED ACTIVITIES ON THE PUEBLO DEPOT ACTIVITY

- An outline of priorities for acquiring additional information to determine if there may be additional projects not yet located or identified
- Establishment of a procedure for the evaluation of historic properties
- Provision of guidelines for the management of historic properties
- Implementation of a legally acceptable compliance procedure with the Advisory Council for Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO)
- Integration of historic preservation requirements with the planning and execution of military undertakings such as training, construction, and real property or land use decisions
- Ranking of facility projects by their potential damage to historic properties
- Identification of funding, staffing and milestones needed to implement the plan.

The identification and evaluation of prehistoric and historic resources on the Depot has been initiated by the completion of this overview and plan. This needs to be followed by a full identification and evaluation program as outlined in Section 5.2: more extensive prehistoric archival review and oral and archival historic review; field surface and subsurface inventory of all undisturbed Depot lands as well as potential sites; and evaluations of resource significance in terms of U. S. Department of the Interior criteria.

Under any schedule, until the determination has been made that identified prehistoric or historic sites are not significant, they must

be managed as if they were, for compliance with Section 110(a)(2) of the National Historic Preservation Act:

(2) With the advice of the Secretary [of the Interior] and in cooperation with the State Historic Preservation Officer for the State involved, each Federal agency shall establish a program to locate, inventory, and nominate to the Secretary all properties under the agency's ownership or control by the agency, that appear to qualify for inclusion on the National Register in accordance with the regulations promulgated under Section 101(a)(2)(A). Each Federal agency shall exercise caution to assure that any such property that might qualify for inclusion is not inadvertently transferred, sold, demolished, substantially altered, or allowed to deteriorate significantly [underlining added].

Under this guidance we recommend that the ten identified potential prehistoric sites on the Pueblo Depot Activity be managed as if they were registered. We suggest that this management include avoidance of the sites by any authorized ground-disturbing activities, and monitoring of the area to restrict its being vandalized.

As outlined in the previous discussion of ideal archeological management goals (Section 5.2), a recommended next stage in the assessment of the importance of the facility's prehistoric and historic archeological resources is an intensive review of geomorphological and archival material as well as evaluation of regional historic research objectives. This review and evaluation should include consultation with the Colorado SHPO to identify and prioritize regional prehistoric and historic research questions to which the archeological information from identified sites might contribute. In addition, the integrity of the prehistoric and historic resources should be assessed by field inspection.

As discussed in Section 5.2 and required by the National Historic Preservation Act (NHPA), the next step in the identification stage of

archeological resource management should be field investigation to locate sites and determine their boundaries, contents, and integrity. NHPA Section 110(a)(2) requires that all federally owned or controlled lands surveyed to identify all significant archeological properties on them. A strict adherence to this would support the immediate intensive archeological inventory of all Pueblo Depot Activity lands not previously surveyed or not clearly documented as having deep and extensive modern ground disturbance. The current prevailing federal policy about the implementation of this requirement is that it should be a "reasonable" program consistent with the overall schedules, budget, and multiple objectives of the land-managing agency. Given the planned construction activities itemized in Section 5.1 and the likelihood that there are significant prehistoric archeological materials on the Depot, it is recommended that it would be most cost-effective to complete the archeological inventory of all undisturbed lands on the facility as soon as it is fiscally possible.

To assess more accurately the natural resources available both to prehistoric and historic inhabitants of the Pueblo facility, the early land survey records and available soil surveys should be examined. In addition, several survey strategies should be employed to provide an accurate assessment of the extant archeological resources.

Based on the archival and field inventory information, the significance of all identified sites should be evaluated following criteria set forth in 36 CFR 60.6 and in accordance with guidelines from the Colorado SHPO. If sites are judged to be significant, a plan for their long-term management should be developed in the context of overall property management. Such management activities might include resource conservation in place, biannual field review of site condition, public interpretation of resource values, scientific investigation of the sites, and/or planned site destruction by military activities. If significant sites are identified, it is recommended that the DARCOM officer responsible for the Pueblo Depot Activity operations provide the Colorado SHPO with the opportunity to review and comment on the proposed management plan. If

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AN ARCHEOLOGICAL OVERVIEW AND MANAGEMENT PLAN FOR THE
PUEBLO DEPOT ACTIVI. (U) WOODWARD-CLYDE CONSULTANTS
WALNUT CREEK CA R KNUDSON 01 OCT 84 CX-5000-3-0771

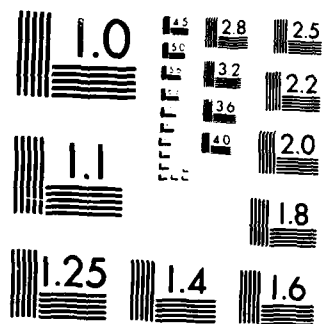
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the evaluation is made that none of the sites on the facility is significant, filing of a report to that effect with the SHPO would complete the facility's compliance requirements for preservation planning.

Federal laws and regulations provide the need and methods for appropriate cultural (prehistoric and historic archeological) resource management on DARCOM installations. These laws and regulations include the national Historic Preservation Act (Sections 110, 106), 36 CFR 60, 36 CFR 800, and Army Regulation 420-40 (see also Chapter 1.0 of this report). Such laws are the groundwork for the facility-specific Historical Preservation Plan (HPP).

Regulation 36 CFR 800 is a basic compliance guide to Section 106 of the National Historic Preservation Act (NHPA). This regulation also provides agencies the chance to develop their own "counterpart" regulations for compliance with Section 106. The Department of the Army counterpart regulations AR 420-40 direct Army policy, procedures, and responsibilities for compliance with NHPA, for the maintenance of state-of-the-art standards for preservation personnel and projects, and for the planning of the facility historic preservation program.

6.2.2 Project-Specific Resource Protection or Treatment Options

Compliance with Section 110 of NHPA requires inventory and evaluation of the facility's historic properties. These historic properties include prehistoric and historic archeological sites, as well as historic architectural or engineering resources. The Pueblo Depot Activity currently has no information concerning facility historic properties. There are at least ten potential prehistoric archeological sites on the facility, and it is likely that more archeological sites exist on the property. Approximately 41 percent (9337 of the 22,654 acres) of the Pueblo facility lands have been subjected to intensive ground-disturbing activities. In order to define the archeological resources base, an intensive survey and inventory of a portion of the Pueblo Depot

Activity's 13,317 undisturbed acres must be initiated. Intensive survey and evaluation will provide basic information including site assemblage variability, depth, integrity, site representativeness, erosion, and so forth. The planning needs of the Pueblo Depot Activity HPP require accurate detailed information about facility archeological resources obtained from intensive field survey. This information is translated into an overall characterization (or predictive model) of facility-wide archeological resources requiring management. Objective decisions concerning archeological resource management, including decisions about saving sites for future archeological techniques and which sites to excavate now for analysis, allow the planner to effectively conserve non-renewable archeological resources. Some archeological resources may not warrant any additional research or management.

Since the Pueblo Depot Activity administers a large area with only one new ground disturbing activity in presently undisturbed areas, it is appropriate to intensively survey a sample of the undisturbed areas. A stratified sample design using natural environmental zones, (such as landform or soil type) as the stratification criterion is recommended. The most manageable sample would be 10 percent of the undisturbed areas of the Depot, or 1,332 acres. Using 40-acre units, 34 survey units would be examined by intensive survey techniques. During the survey program, evaluations can be made at regular intervals to adjust, as needed, the sample units if biases or other problems are identified.

A carefully conceived and executed sample survey program is a cost-effective way to characterize the facility's archeological resource base. In addition, the information from such a survey can be used in future construction planning to avoid any archeological sites. The survey will identify those resources likely to be eligible for nomination to the National Register of Historic Places (NRHP). Since surface survey is not always sufficient for determining site significance (36 CFR 60.6), test excavations are recommended to evaluate the character and extent of the subsurface archeological resources if the resources are threatened by future ground disturbing activities.

Given these activities, the next step will be to develop a historic preservation plan for the archeological resources determined to be of scientific significance. The historic preservation plan must be confirmed by consulting the SHPO and ACHP. Procedures and references in AR 420-40 will be helpful in this matter. Goals for this management program will bring the Department of the Army in compliance with Section 110(a)(2) of the NHPA.

In addition to the intensive survey activities, it is recommended that the ten potential archeological resource locations be field checked and formally recorded, as appropriate. The recording of these archeological resources will be similar to the procedures used during the intensive survey of the 34 sample units.

6.3 ESTIMATED SCOPE OF WORK AND COST LEVELS FOR PRESENTLY IDENTIFIABLE MANAGEMENT NEEDS

6.3.1 Goals

The scope of work for the management recommendations is a general statement that provides facility planners with an understanding of the distribution and characteristics of the Pueblo Depot Activity's surface archeological materials. It covers the intensive survey and evaluation of 10 percent of the presently undisturbed areas of the depot activity. The ten potential archeological resource locations must also be checked and evaluated in the field. Before fieldwork begins, comprehensive background documentary research is recommended for historic archeological resources that could exist on the depot activity's property. Examination of local prehistoric artifact collections (from collectors on the activity) is also recommended before fieldwork begins.

The sources to be reviewed prior to fieldwork will provide initial information about historic and prehistoric archeological resources. Sources include:

- archival information available at the Pueblo Depot Activity, Tooele Depot, and the national archives (Record Group 156);

- private and public artifact collections that have documentation sufficient for identification and use as comparative materials for analyzing the Pueblo Depot Activity archeological resources;
- wills, deeds, and property for records associated with past land use of the depot activity's property, and
- surface and aerial photographs of the facility.

The intensive field survey of 40-acre sample units and ten potential archeological resource locations should determine the following:

- location and boundaries of surface sites;
- the variety and extent of natural and cultural erosion patterns;
- cultural components expected from the site;
- site activities (function), such as campsite, hunting station, kill site, homestead, school, and
- relationship of the site to its environmental setting.

A final goal is the incorporation of any information available through the HABS research at the Pueblo Depot Activity.

6.3.2 Activities

Pre field archival and documentary research will compile all relevant archeological resource data that exist for the Pueblo Depot Activity and the immediate area. This activity may require trips to the Pueblo Depot Activity, Tooele Depot, the national archives in Washington DC, and the Pueblo, Colorado public records office. Given the possible difficulty in finding and copying the relevant information, it is estimated that one person would require 20 work-days. Presentation of the results in a final report will also take 20 work-days to complete.

The intensive survey for archeological resources will locate and record all cultural resources on the present land surface. Sample units

will be selected using the guidance presented in Section 6.2.2. The sampling design should require five work-days of effort. Unfortunately, there is no information about prehistoric site densities, or how complex the sites could be. Assuming that: (1) a crew of three persons can survey approximately 100 acres each work-day; (2) there is an average of five sites/mi²; and (3) that these sites are generally prehistoric resources averaging no more than 1000 m² in size, then the intensive survey will require 14 work-days. Laboratory analyses and writing the final report will require an additional 14 work-days.

Field investigation and possible recording of the ten potential archeological resources will require the survey team to spend approximately ten hours in the field and ten hours in the office for analysis and publication.

6.3.3 Personnel Qualifications and Estimated Costs

The persons involved in the archeological management activities must have the professional qualifications as specified in AR 420-40, Appendix C. An experienced cultural resources manager should direct these activities. This person should also have the necessary qualifications, as specified by 36 CFR 66 and the SHPO, to undertake such a management job. For the Pueblo Depot Activity, the director of the management operations will be assisted by two qualified technicians both in the field and in the laboratory/office.

Costs of the recommended actions are expressed in 1984 dollars. The archival and documentary research requires 40 work-days of research activity and a write-up. A unit cost of \$20-\$25 per hour includes travel costs, data management, search fees, telephone bills, and copy costs; it does not include a fee, general and administrative costs, or inflation multiplier. Thus, the calculated effort of 40 work-days, or 320 work-hours, is estimated to cost between \$6400 and \$8000.

The intensive archeological field survey of the 34 40-acre sample units, given the assumption stated above, will require 28 work-days for a

three-person crew, or 672 work-hours. Added to this will be the time to prepare the sampling design (40 work-hours) and to visit and evaluate the 10 potential archeological resource locations (60 work-hours). All necessary travel, reference work and telecommunications are included within a unit rate of \$20-\$25/work-hour, but that rate does not include fee, general and administrative, or inflation factor. The estimated effort of 772 work-hours will cost between \$15,440 and \$19,300.

If the activities outlined above are completed as the first portion of a historic preservation planning effort at the Pueblo Depot Activity, their base costs are estimated to be between \$21,840 and \$27,300 in FY84 dollars.

The Pueblo Depot Activity, located ten miles east of the city of Pueblo in Pueblo County, Colorado, is a 22,645-acre installation of the U. S. Department of the Army DARCOM Command. A body of federal laws and regulations provides the need and methods for appropriate cultural resource management at DARCOM installations. These laws and regulations are the groundwork for facility-specific historic preservation planning (HPP).

No archeological sites are presently recorded on the Depot property; however, there are at least ten potential prehistoric archeological resource locations (and probably more) now known within the facility boundaries. The culture history of the surrounding area suggests that additional archeological resources could occur in the undisturbed portions of the facility; further, given the area's present and past environmental characteristics and recent ground-disturbing activities (natural and man-made), certain geomorphological contexts have a high probability for protecting the physical integrity of these cultural resources. Many characteristics of the archeological resources are incompletely known or understood, as so few archeological research or management studies have been completed in the Pueblo Depot Activity area. Archeological resources considered most significant from a research point of view are sites of the Selby-Dutton, Folsom, Early Archaic, and Ethnohistoric periods. Important research questions still remain for archeological resources assigned to the Clovis and Plano periods, the Middle and Late Archaic periods, the Early and Middle Ceramic periods, and the Historic period.

Given the location of the proposed ground-disturbing activities on the Pueblo Depot Activity, an intensive field survey of a stratified sample of the undisturbed property (ten percent of 13,316 acres, or 1332 acres) is recommended as the first step in establishing a Pueblo Depot Activity Historic Preservation Plan. Inventory and evaluation of ten potential archeological resource locations identified in this report is also recommended. Archeological resources found during survey will be evaluated for potential nomination to the National Register of Historic Places. These data, in combination with background documentary research, will provide the necessary planning information concerning the locations and types of archeological resources expected to exist within the Pueblo Depot Activity.

Anticipated costs for accomplishing these management recommendations for the Pueblo Depot Activity should range between \$21,840 and \$27,300 in FY84 dollars.

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APPENDIX A
RESOURCE LOCATIONAL DATA

TABLE A-1. LOCATIONAL DATA, POTENTIAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

Site No. ^a	UTM ^b		USGS ^c Quad Map	Confidence ^d Rating
	Northing	Easting		
PDA-1			NA760	3
PDA 2			NA760	3
PDA-3			NA760	3
PDA-4			NA760	3
PDA-5			NA760	3
PDA 6			NA760	3
PDA 7			NA760	3
PDA-8			NA760	3
PDA 9			NA760	3
PDA 10			NA760	3

^a Potential resource locations are mapped in Figure A-1.

^b UTM = Universal Transverse Mercator coordinates, Zone 13. If the area is less than 10 acres in extent, the coordinates record the approximate center of the site. If it is larger, they record the corner of a 3-or-more sided figure then encloses the site.

^c NA76074 = North Avondale, Colorado 7.5 min. (1960).

^d The Confidence Rating (CR) is an evaluation of the perceived reliability of the site location data. 1 = the information is more guess than science; 2 = the judgment is moderately reliable; 3 = the information is most likely reliable.

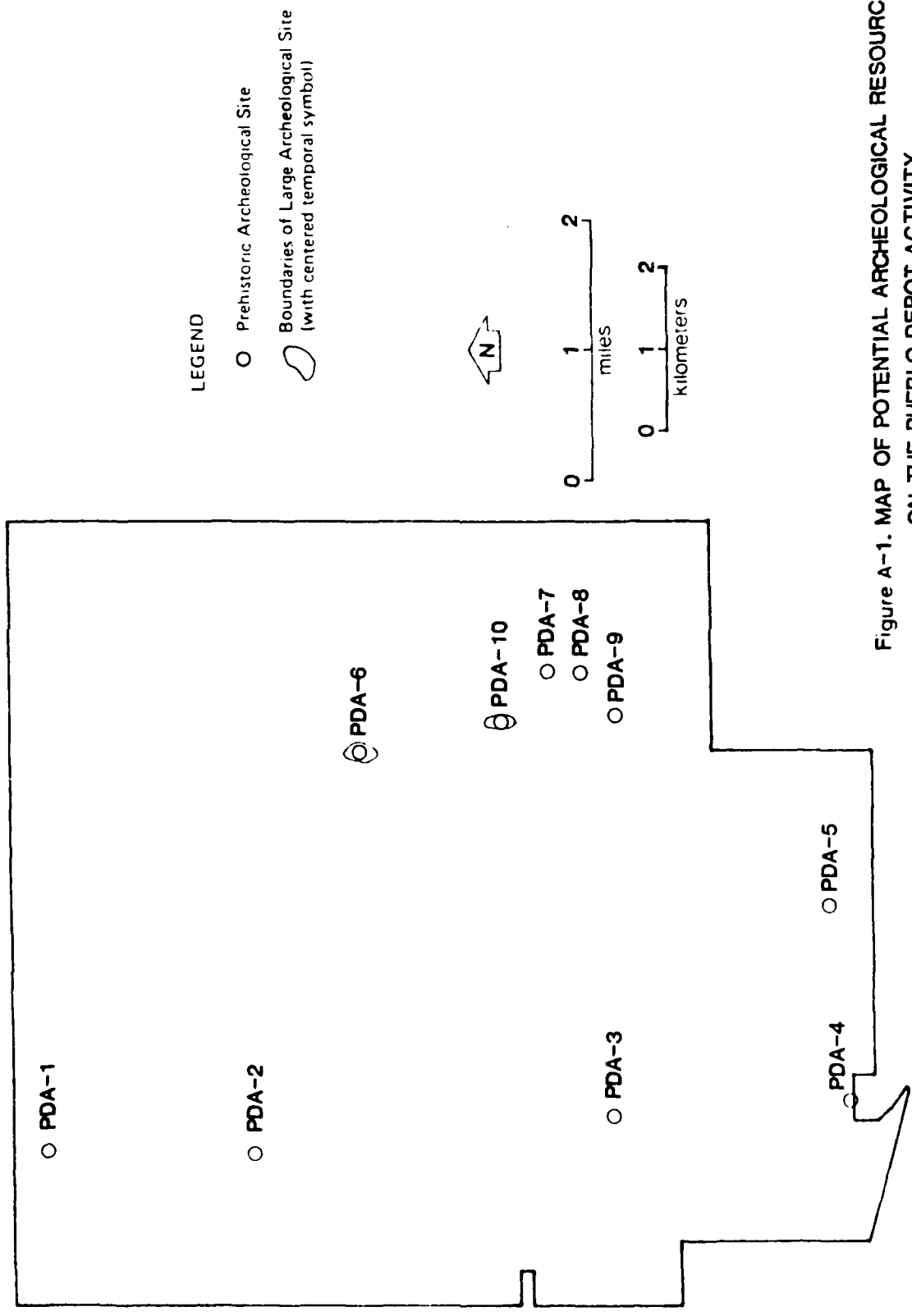


Figure A-1. MAP OF POTENTIAL ARCHEOLOGICAL RESOURCES ON THE PUEBLO DEPOT ACTIVITY

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